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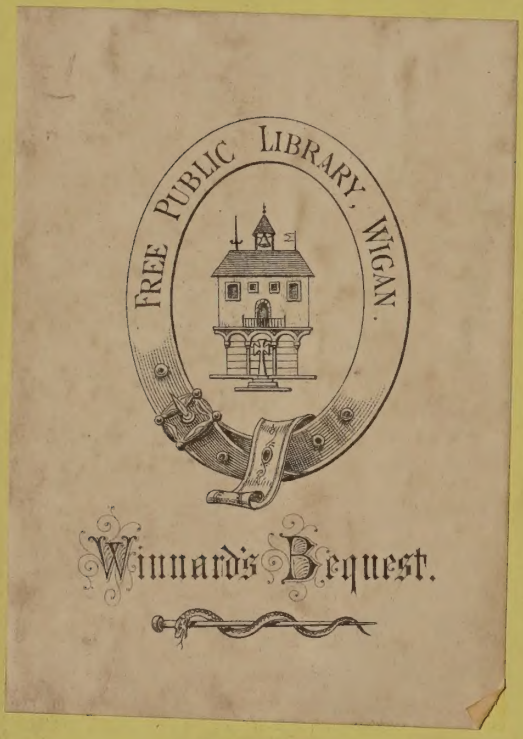

Volume 1, all published.

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84 plates

ATLAS OF DESCRIPTIVE ANATOMY.

ATLAS

OF THE

DESCRIPTIVE ANATOMY

OF

THE HUMAN BODY,

BY

J. C. CRUVEILHIER, M.D.,

PROFESSOR OF ANATOMY TO THE FACULTY OF MEDICINE, PARIS.

WITH EXPLANATIONS BY C. BONAMY, M.D.,

LECTURER ON ANATOMY AND PHYSIOLOGY.

THE FIGURES DRAWN FROM NATURE BY

EMILE BEAU.

VOL. I.

OSTEOLOGY, SYNDEMOLOGY, MYOLOGY.

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TO

JOHN CRUVEILHIER, M.D.,

PROFESSOR OF MEDICINE IN THE FACULTY OF PHYSIC OF PARIS,

ASSOCIATE OF THE ROYAL ACADEMY OF MEDICINE,

PRESIDENT OF THE ANATOMICAL SOCIETY,

&c., &c., &c.,

THIS WORK

IS, WITH GREAT RESPECT,

INSCRIBED BY HIS OBLIGED AND GRATEFUL

FORMER PUPILS AND FRIENDS,

C. BONAMY AND EMILIUS BEAU.

ADVERTISEMENT.

As we have followed the plan pursued by Professor Cruveilhier in the Second Edition of his Work on DESCRIPTIVE ANATOMY, we have left out several Muscles, which will appear in the SPLANCHNOLOGY, along with the organs to which they belong.

The Muscles of the face, moreover, as they form an entirely special system, will be exhibited in connexion with the organs of sense. Along with the Muscles, a certain number of FASCIÆ have been figured, inasmuch as they appertain essentially to the Muscles, and may generally be regarded as their tendinous expansions, means of insertion, etc. The CONTAINING APONEUROSES of the muscles, however, will be better shown along with the ANGEIOLOGY, the Chapter to which, they are consequently deferred.

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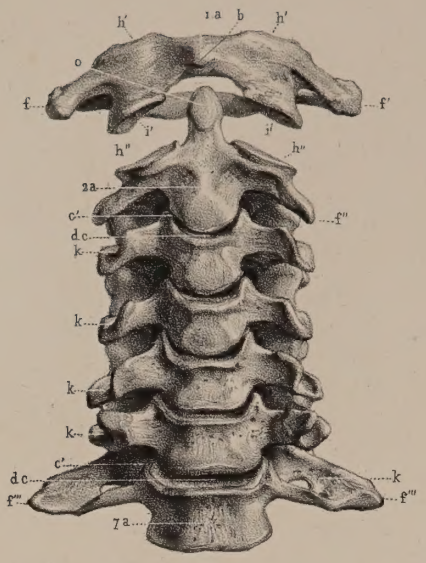

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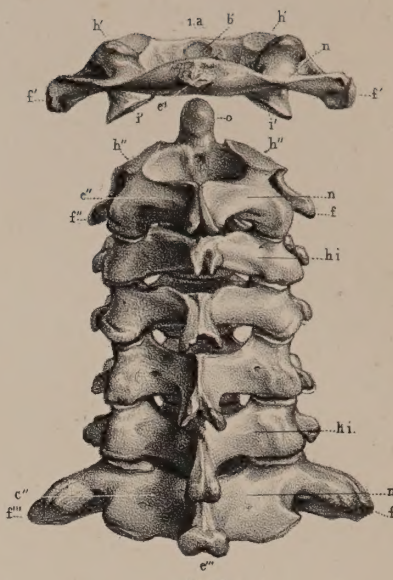

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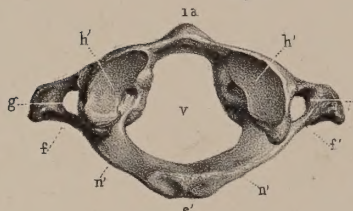

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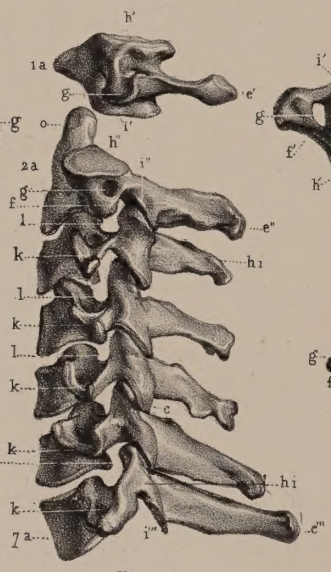

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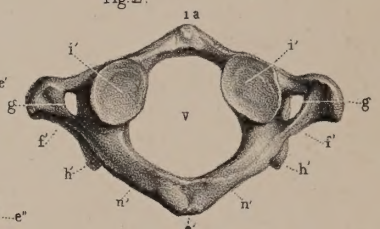

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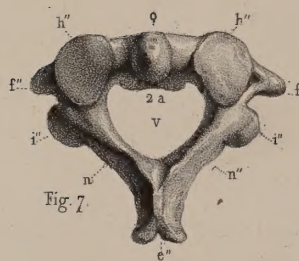

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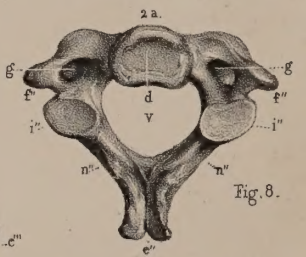

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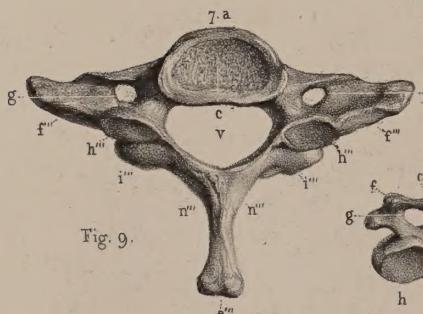

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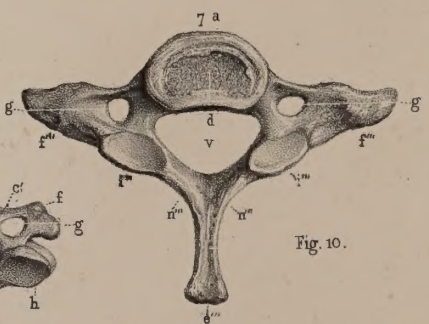

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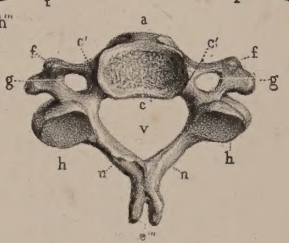


Fig. 4.

PLATE I.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE VERTEBRAL COLUMN,

COMPOSED OF TWENTY-FOUR VERTEBRÆ, SEVEN OF WHICH BELONG TO THE NECK,—THE CERVICAL VERTEBRÆ, TWELVE TO THE BACK,—THE DORSAL VERTEBRÆ AND SEVEN TO THE LOINS,—THE LUMBAR VERTEBRÆ; TO WHICH MUST BE ADDED THE SACRUM AND THE COCCYX.

CERVICAL VERTEBRÆ.

Fig. 1. Anterior aspect of the cervical vertebræ. Fig. 2. Posterior aspect. Fig. 3. Lateral aspect. Fig. 4. Superior surface of the third cervical vertebra. Fig. 5. Superior and fig. 6. Inferior surface of the Atlas. Fig. 7. Superior and fig. 8. Inferior surface of the axis or vertebra dentata; front and back views of which are presented in figs. 1 and 2. Fig. 9. Superior and fig. 10. Inferior surface of the seventh cervical vertebra.

BODIES OF THE CERVICAL VERTEBRÆ, *a*, fig. 4. 1*a*--7*a*, figs. 1 and 2, bodies of these vertebræ. 1 *a*, (figs. 1, 2, 3, 5, 6,) first cervical vertebra or atlas, in which the body is replaced by an arch—the anterior arch of the atlas; *b*, tubercle of the atlas. 2 *a*, (figs. 1, 3, 7, 8,) body of the second vertebra, the axis or dentata; *o*, the odontoid process, which presents two articular facettes, the one, anterior, *o*, fig. 1, corresponds with a facette, *b'*, fig. 2, scooped out of the concavity of the anterior arch of the atlas; the other posterior, *o*, fig. 2, corresponds with the transverse ligament: 7 *a*, (figs. 1, 3, 9, 10,) body of the seventh vertebra—the vertebra prominens; *c*, fig. 4, superior aspect of the body of the third cervical vertebra; *c'c'*, its unciform processes; *d*, fig. 8, inferior aspect of the body of the axis; *d*, fig. 10, inferior aspect of the body of the seventh cervical vertebra; *d c*--*d c*, fig. 1, inferior and superior edges of the bodies of the cervical vertebræ; and *c'*--*c'*, unciform processes of the superior surface.

SPINOUS PROCESSES.—*e*, fig. 4, spinous process, bifurcated at its extremity and having a groove inferiorly, *e''' e'''*, figs. 8 and 10; *n*, *n*, fig. 4, the laminæ; *e''*--*e'''*, figs. 2 and 3, spinous processes of the cervical vertebræ, and *n*-*n*, fig. 2, the laminæ. In the atlas the spinous process is replaced by a tubercle at the posterior part, *e'*, figs. 2, 5, 6, and the laminæ become a posterior arch.

n, fig. 2, *e'' e''*, figs. 7 and 8, spinous process of the axis, which is more developed than those of the other vertebræ, the laminæ also, *n'' n''*, are thicker; *e'''*, figs. 2, 3, 9, 10, spinous process of the seventh cervical vertebra, it is longer than that of the other vertebræ, whence the name Prominent Vertebra; it is not bifurcated at its extremity; *n''' n'''*, the laminæ.

TRANSVERSE PROCESSES.—*f*—*f*, fig. 4, transverse processes; they have a groove, two tubercles at the extremity, and are pierced by a foramen at their base. *f'*--*f'''*, figs. 1 and 2, transverse processes of the cervical vertebræ; *k*--*k*, figs. 1 and 3, grooves in the transverse processes of the second, fourth, fifth, sixth, and seventh cervical vertebræ; *f' f'*, figs. 1, 2, 5 and 6, transverse processes of the atlas; these are much longer than those of the five vertebræ immediately below it, and terminate in a rounded point, which is sometimes double; *g*, the foramen at their base; *f''' f'''*, figs. 1, 2, 9, 10, transverse processes of the seventh cervical vertebra; they are much longer and less grooved; *g*, foramen, at the base.

ARTICULATING PROCESSES.—*h h*, fig. 4, superior articulating processes; *hi*--*hi*, figs. 2, 3, superior and inferior articulating processes, *h' i'*, *h' i'*, figs. 1, 2, 3; these processes are very large in the atlas, and are, by some, called lateral masses; *h' h'*, fig. 5, the superior articulating surfaces, and *i' i'*, fig. 6, the inferior articulating surfaces; *h'' h''* figs. 1, 2, 3, the superior articulating processes of the axis, they are very close to the body; *i''*, fig. 3, the inferior articulating surfaces; they are the same as those of the other vertebræ; *h'' h''*, fig. 7, its superior articulating surfaces, and *i'' i''*, fig. 8, its inferior articulating surfaces; *h''' h'''*, fig. 9, superior articulating surfaces of the seventh, and *i''' i'''*, figs. 9 and 10, its inferior articulating surfaces; they are not much developed; the inferior articulating surfaces *i''' i'''*, figs. 3 and 10, are nearly vertical.

NOTCHES AND INTERVERTEBRAL FORAMINA.—*l l*, fig. 3, foramina formed by the superior and inferior notches of the vertebræ. In the first vertebra, 1 *a*, figs. 2, 5, 6, the notches become grooves, situated on the posterior arch immediately behind the lateral masses. The axis has no notch at its superior part; *v*, fig. 4, 5, 6, 7, 8, 9, 10, vertebral foramen. (See Plate IV.) Posterior aspect of the bodies of the vertebræ, and of the vertebral canal.

PLATE II.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE VERTEBRAL COLUMN.

DORSAL VERTEBRÆ.

Fig. 1. Superior surface of the sixth dorsal vertebra. Fig. 2. Inferior surface of the same. Fig. 3. Anterior aspect of the dorsal vertebræ. Fig. 4. Posterior aspect. Fig. 5. Lateral aspect.

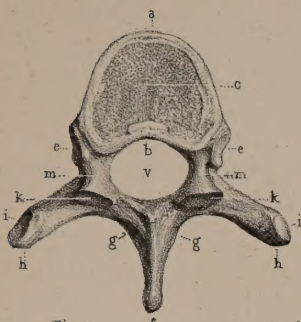
Bodies of the dorsal vertebræ.—*a*, figs. 1 and 2; 1 *a*--12 *a*, figs. 3 and 4, the bodies of the dorsal vertebræ; *c*, figs. 1, 3, 4, 5, the superior surface of these vertebræ. In the first dorsal vertebra the superior surface of the body has two unciform processes, *c' c'*, figs. 3 and 4, as in the cervical vertebræ; *d*, fig. 2, the inferior surface; *dc--dc*, figs. 3 and 4, superior and inferior surfaces of the bodies of the vertebræ; they give insertion to a fibro-cartilage, which binds them firmly to each other; *ee*, fig. 1, superior half-depressions; *ee*, fig. 2, inferior half-depressions; *e e'' e'''*, fig. 4, superior and inferior half-depressions on the bodies of the vertebræ. These half-depressions correspond with those of the next vertebra, and form whole depressions with which the heads of the ribs articulate. The first vertebra, 1 *a*, fig. 4, has almost a whole depression at the upper part of the body—the lower depression is very small. In the three last vertebræ each body has but one whole depression, *e' e'' e'''*. The depression, *e'*, of the tenth is sometimes partly formed by a small depression at the inferior part of the ninth.

Spinous processes.—*f f*, figs. 1 and 2; *f--f*, figs 4 and 5, spinous processes of the dorsal vertebræ. The spinous processes of the two last vertebræ are broader and thicker than those of the others; and are more nearly horizontal in their direction; *g g*, figs. 1, 2, 4, and 5, the laminæ of the vertebræ.

Transverse processes.—*h h*, fig. 1 and 2; *h*, *h'*, *h''*, figs. 3, 4, 5, transverse processes of the dorsal vertebræ; they have at their extremity a groove or depression to articulate with the tubercles of the ribs. The transverse processes, *h' h''*, of the two last vertebræ are very short, and have no articular depressions; the transverse processes of the tenth often present the same appearances.

Articulating processes.—*k k*, figs. 1, 3, 4, 5, superior articulating processes; they look backwards; *l l*, figs. 2, 4, 5, inferior articulating processes; they look forwards; *lk--lk*, fig. 4, superior and inferior articulating processes of the dorsal vertebræ. The articulating processes, *k*, of the first vertebra, 1 *a*, figs. 4 and 5, are oblique, like those of the cervical vertebræ. The inferior articulating surfaces, *l*, of the twelfth are convex, and turned outwards, like those of the lumbar vertebræ.

Notches and intervertebral foramina.—*m m*, fig. 4, superior notches; *m m*, fig. 2, inferior notches; *m—m*, fig. 4, notches and pedicles of the dorsal vertebræ; *m'—m'* intervertebral foramina; *v v*, figs. 1 and 2, vertebral foramen. (See Plate IV.) The vertebral canal and posterior aspect of the bodies of the vertebræ.



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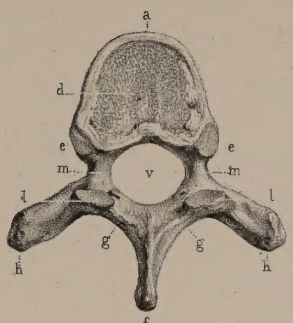

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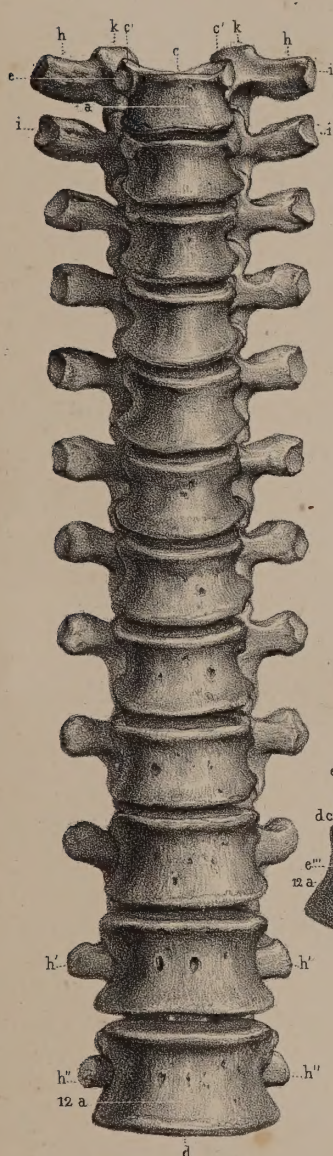

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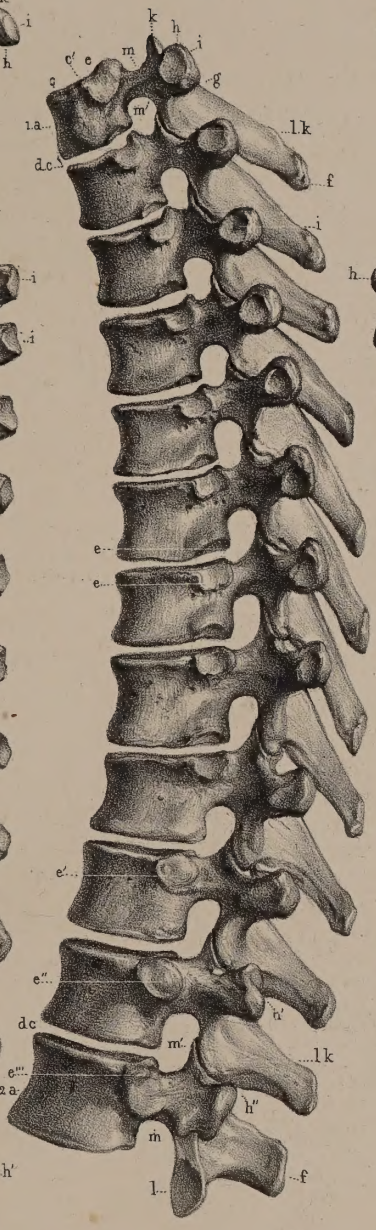

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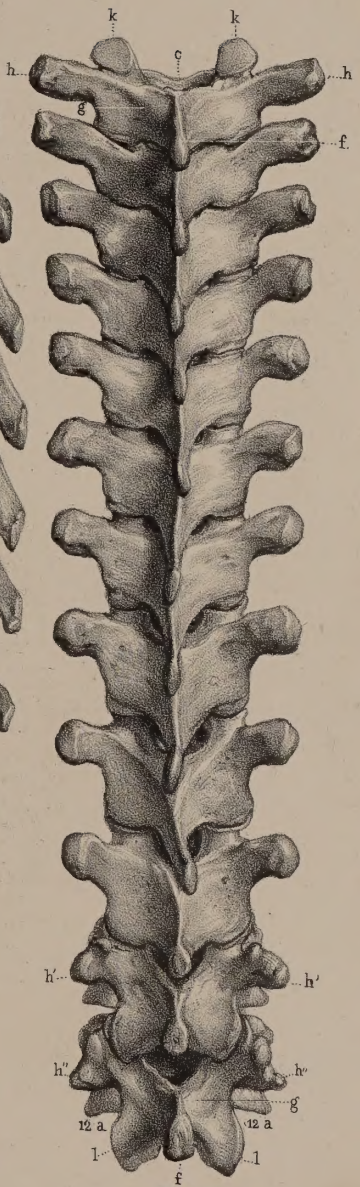

Fig. 5.

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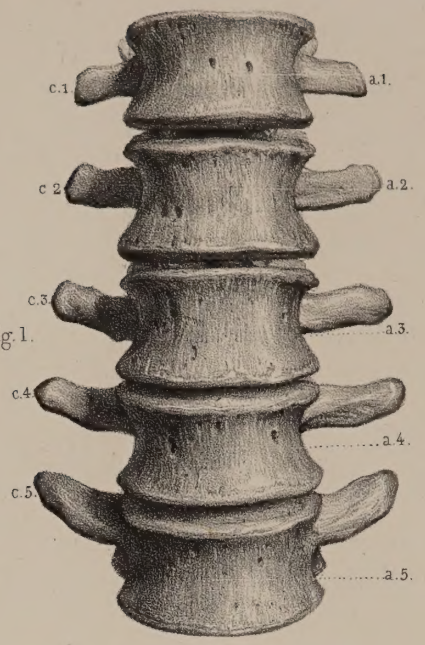

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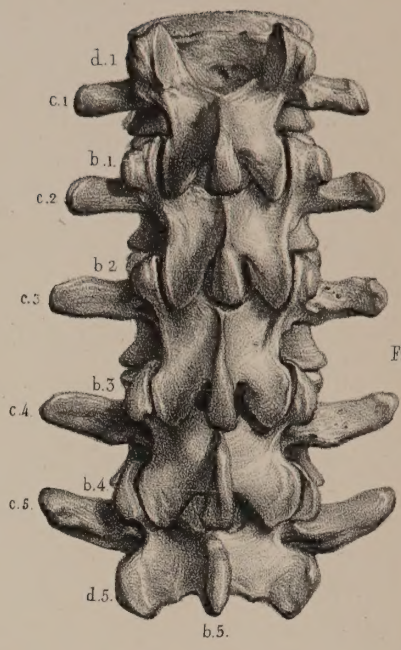

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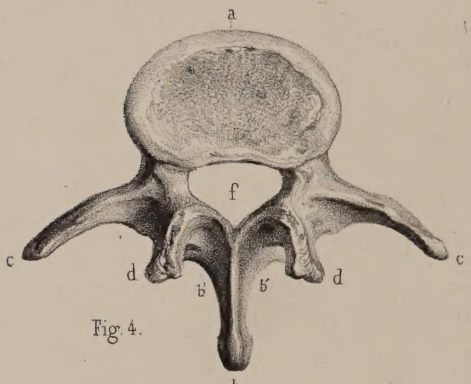

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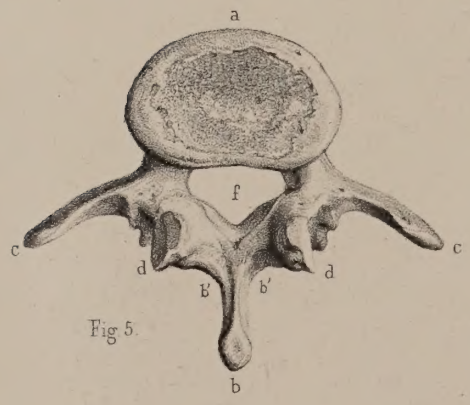

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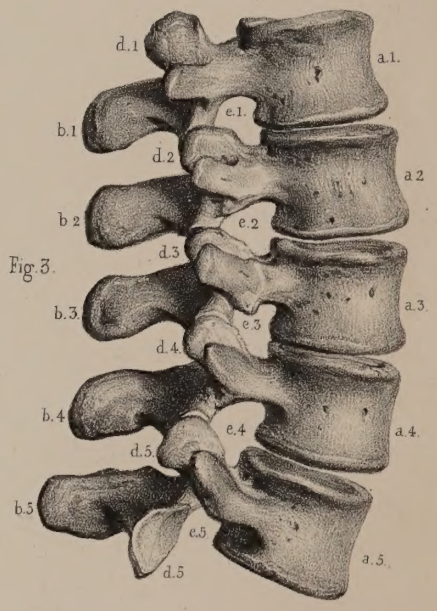

Fig. 3.

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PLATE III.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE VERTEBRAL COLUMN.

THE LUMBAR VERTEBRÆ.

Fig. 1, anterior aspect of the lumbar vertebræ. Fig. 2, posterior aspect. Fig. 3, lateral aspect. Fig. 4, superior surface of the third lumbar vertebra. Fig. 5, inferior surface.

BODIES OF THE LUMBAR VERTEBRÆ. *a* 1—*a* 5, figs. 1 and 3, bodies of the vertebræ; *a*, fig. 4, superior surface; *a*, fig. 5, inferior surface. The inferior surface of the fifth *a* 5, fig. 3, is oblique from before backwards and from below upwards; it articulates with the base of the sacrum.

SPINOUS PROCESSES. *b*, figs. 4 and 5; *b* 1—*b* 5, figs. 2 and 3, spinous processes, which are very broad and thick; *b'* figs. 4 and 5, the laminæ, which are short and strong.

TRANSVERSE PROCESSES. *c*, figs. 4 and 5; *c* 1—*c* 5, figs. 1, 2, and 3, transverse processes: these processes are long and flattened, and are placed on a plane anterior to that of the dorsal vertebræ: they are like smaller ribs.

ARTICULATING PROCESSES. *d* 1—*d* 5, figs. 2 and 3, articulating processes: the superior ones *d*, fig. 4, are concave, and terminate anteriorly in two tubercles: the inferior *d*, fig. 5, are convex, except those of the fifth vertebra *d* 5, fig. 3, which have a plane surface.

NOTCHES AND INTERVERTEBRAL FORAMINA. *e* 1—*e* 5, fig. 3, intervertebral foramina formed by the superior and inferior notches of the contiguous vertebræ; *f*, figs. 4 and 5, vertebral canal. (See PLATE IV.)

PLATE IV.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE VERTEBRAL COLUMN.

THE SACRUM.

Fig. 1, anterior concave surface of the sacrum, crossed by four prominent lines, *b*—*b*, which mark the union of the five false vertebræ, *a*, of which the bone is formed; *c*—*d*, anterior sacral foramina and grooves; *c*, base of the sacrum; *f*, its apex.

Fig. 2, posterior surface; *a*—*b*, crest of the sacrum, analogous to the spinous processes of the vertebræ: on each side, *c*, grooves of the sacrum; *d*—*d*, posterior sacral foramina, bounded internally by a series of eminences, analogous to the articulating processes, and externally, by another line of eminences which are rudiments of the transverse processes; *g*, base of the sacrum; *h*, its truncated apex; *i*—*k*, inferior orifice of the sacral canal and cornua of the sacrum.

Fig. 3, lateral aspect; *a*, auricular surface, which articulates with the ilium; *b*, base; *c*, promontory; *d*, apex of the sacrum.

Fig. 4, Superior aspect or base; *a*, oval surface which articulates with the inferior surface of the body of the last lumbar vertebra; *b*, superior orifice of the sacral canal, bounded by two laminæ, which unite to form a spinous process, *c*; *d*—*e*, articulating processes; *f*—*g*, concave surface, forming part of the iliac fossa.

THE COCCYX.

Fig. 5, posterior aspect of the coccyx, crossed by three or four lines which mark the union of the different pieces of which it is composed. Its base articulates with the apex of the sacrum, and presents two processes *b*—*c*, which are called the cornua of the coccyx, and two notches *d*—*e*; *f*, apex of the coccyx.

OF THE VERTEBRAL COLUMN.

Fig. 6, antero-posterior section of the vertebral column. When viewed laterally it presents four alternate curves: it is convex in the cervical region, 1—7, and becomes concave in the dorsal, 7—19; convex again in the lumbar, 19—24, and concave in the sacro-coccygeal region, 25—26; *a*, bodies of the vertebræ in the different regions; *b*, anterior surface of the sacrum; *c*, anterior surface of the coccyx; *b'*, promontory of the sacrum; *d*—*e*, spinous processes of the vertebræ; *f*, crest of the sacrum; *g*—*g*—*g*—*g*, vertebral canal: this canal, which is situated in the thickness of the vertebral column, and follows its curves, is protected, anteriorly, by the bodies of the vertebræ; posteriorly, by the spinous processes, and on each side by the transverse processes and laminæ. Its size is not the same in the whole of its course, but is largest in the cervical and lumbar regions; *h*—*h*—*h*, intervertebral foramina, of which there are the same number as there are vertebræ; the largest is that between the fourth and fifth lumbar vertebræ. These foraminæ diminish in size in the dorsal region, and become slightly larger again in the cervical.

Fig.1.

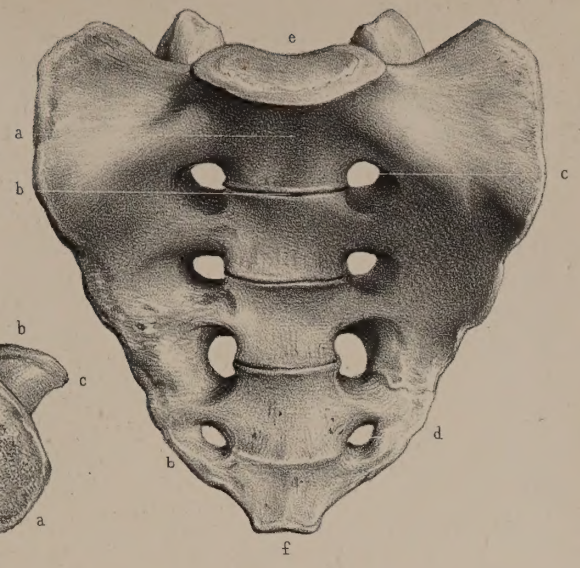
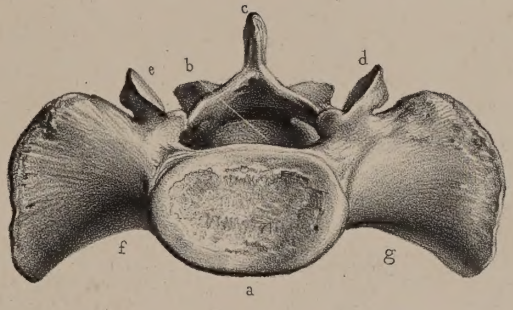


Fig. 3.

Fig. 4.



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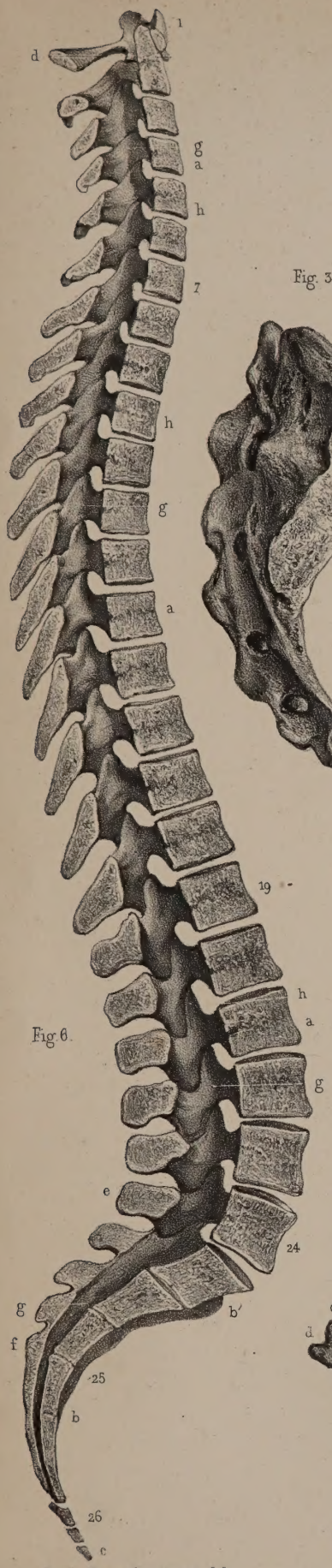

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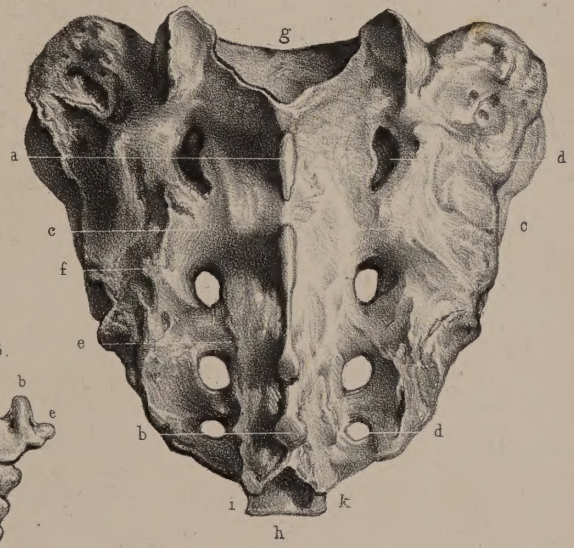

Fig. 5.

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Pl. 5.

Fig. 2.

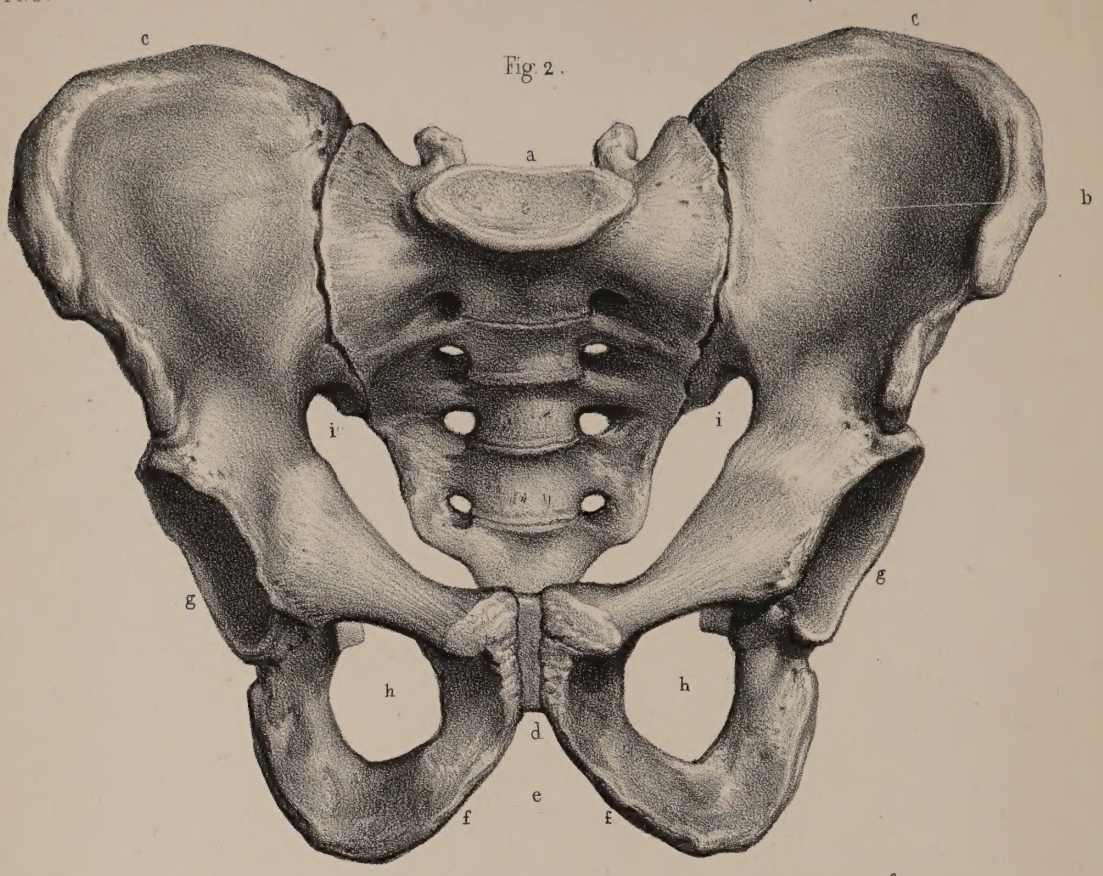

Fig. 1.

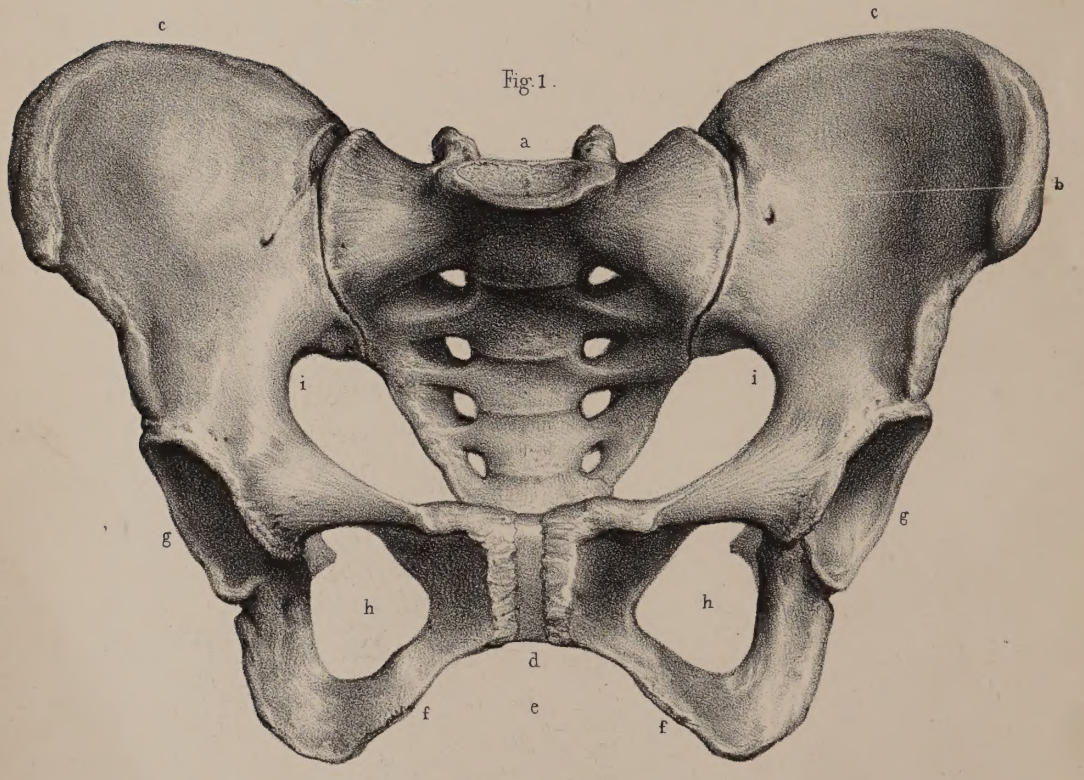

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PLATE V.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE PELVIS.

The pelvis is a large basin-shaped cavity, formed by the sacrum and coccyx behind, and by the two ossa innominata in front and at the sides. It is intermediate between the spinal column, which rests on its posterior part, and the femurs which articulate with its lateral and anterior aspects.

Difference of the pelvis in the two sexes.

Fig. 1, female pelvis. Fig. 2, male pelvis.

The pelvis is, unquestionably, that part of the skeleton which establishes most clearly the difference between the two sexes; this difference exists principally with reference to the functions of the female, namely, gestation and labour. The cavity of the pelvis of the female is larger in every way than that of the male, but particularly in its breadth; the male pelvis is compressed from each side so as to diminish its breadth but add to its height, and the bones of which it is composed are thick and supplied with large processes for the attachment of muscles. In the female, the sacrum, *a*, is shorter, broader, and more curved than in the male; the iliac fossæ, *b*, are broader and less perpendicular; the crista iliaca, *c*, is less thick and forms a segment of a large circle; the symphisis pubis, *d*, is shorter; the arch of the pubis, *e*, is broad and rounded, whilst in the male it is narrow and triangular. The rami of the arch are also thinner and everted, so as to present a surface and not an edge to the head of the fœtus during labour; the tuberosities of the ischia are further apart, and the space which separates the two acetabula, *g—g*, is much greater, which gives that prominence to the trochanters and that peculiar character observable in the walk of the female. The thyroid foramen, *h*, is triangular in the female, and oval in the male; the brim also, *i—i*, is wider and more of an elliptical shape in the female than in the male.

PLATE VI.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE THORAX.

Fig. 1, lateral aspect of the right half of the thorax.

The thorax is a cavity formed posteriorly, by the union of the twelve dorsal vertebræ, 1 *a*—12 *a*, anteriorly by the sternum, *b*, and on each by the twelve moveable arches called ribs, 1 *c*—12 *c*.

THE STERNUM.

Fig. 1, *b*, the sternum; its anterior surface is slightly convex, and presents some prominent transverse lines, which mark the separate pieces of which it is composed in infancy; *e*, superior extremity; *f*, inferior extremity.

Fig. 2, posterior surface of the sternum, which has prominent lines corresponding to those of the anterior surface. The uppermost of these lines, *a*, marks the union of the two upper pieces of the sternum and remains cartilaginous for a long time. The borders present seven articular cavities, which are separated from each other by depressions.

The superior extremity has a notch or depression, *c*, at its upper part, and on each side of it; *d*—*d*, a concave articulating surface for the clavicle.

The inferior extremity, *e*, is terminated by the ensiform appendix, called also ensiform or xyphoid cartilage, as it usually remains cartilaginous to an advanced age.

THE RIBS.

Fig. 1, there are twelve ribs, 1 *c*—12 *c*, on each side, they are osseous in four-fifths of their extent, and cartilaginous in the anterior fifth, which part is called the costal cartilage. The seven upper ribs, 1 *c*—7 *e*, which extend from the vertebræ to the sternum, are called the sternal or true ribs; the five others, 7 *c*—12 *c*, which are not prolonged to the sternum, are asternal or false ribs; the two last have also been called the floating ribs.

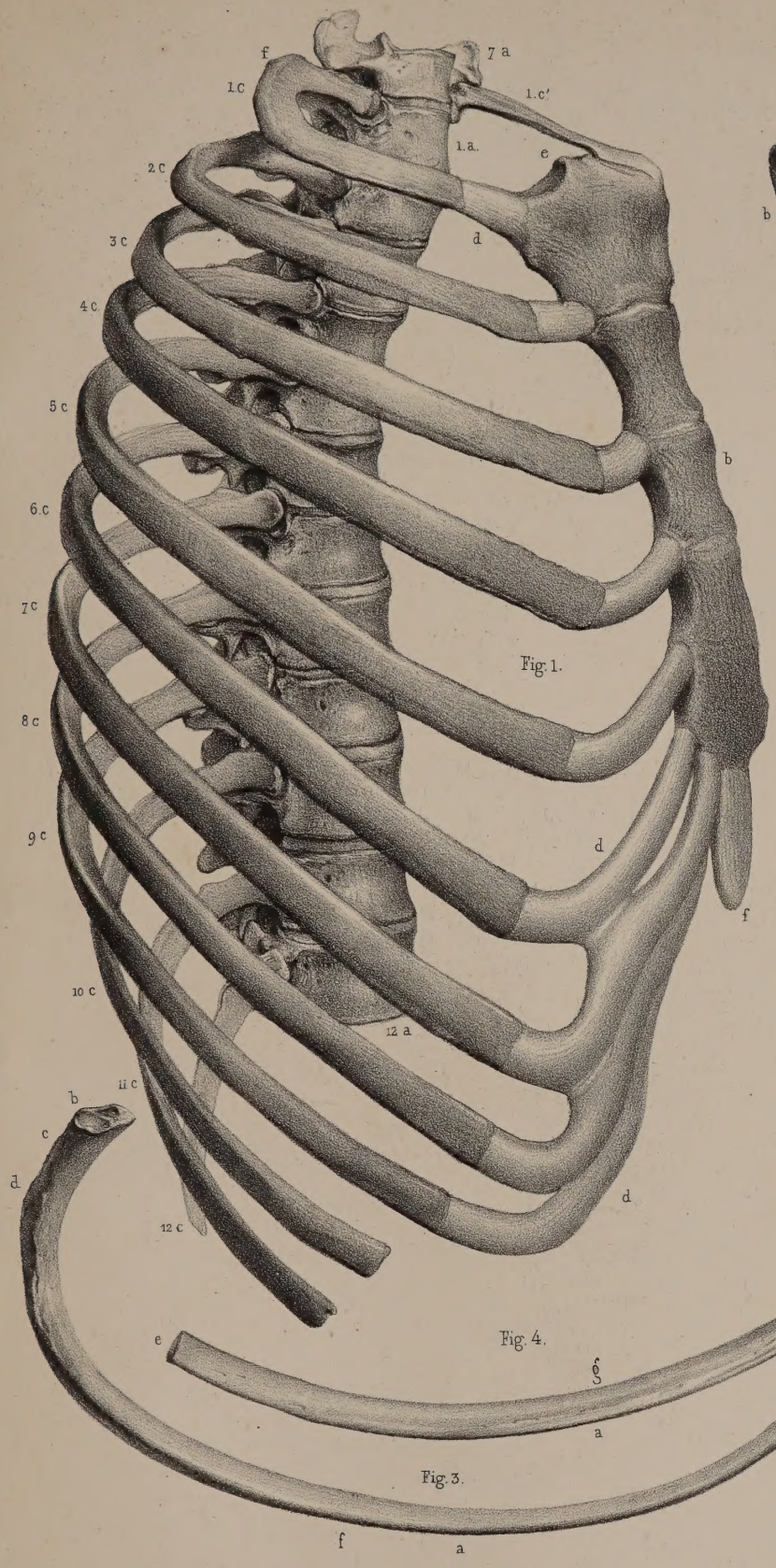
The ribs are mostly twisted on themselves, in such a manner that their two extremities cannot rest at the same time on a plane surface; the point of torsion is marked by a rough line, which is called the angle of the rib.

Figs. 3 and 4. Each rib presents to our consideration a body, *a*, and two extremities, *b* and *e*; the posterior extremity, *b*, has two articulating surfaces, separated by a ridge; *c*, the neck or cervix of the rib; *d*, the tubercle of the rib divided into two parts, of which the external one, fig. 3, is rough and gives insertion to a ligament; and the internal, fig. 4, is smooth and articulates with the transverse processes of the vertebræ; the anterior extremity, *e*, is hollow for the attachment of the cartilage. The external surface of the bone is convex, the internal, concave; the superior border, *f*, fig. 3, is thick and rounded; the inferior, *g*, fig. 4, is marked by a groove, *h*.

The first rib, 1 *c* and 1 *c'*, fig. 1, presents some peculiarities by which it may easily be distinguished from all the others; it is the shortest, and is not twisted on itself like the others, and has no angle: its posterior extremity has usually but one articulating surface, which corresponds with the half-surface on the body of the first dorsal vertebra; sometimes it has a small surface that articulates with the body of the seventh cervical vertebra, 7 *a*; the tubercle, *f*, is very large; and the two surfaces look directly upwards and downwards; the upper surface has on it a tubercle which gives insertion to the scalenus anticus muscle; the cartilage of the first rib, *d*, is very short and thick.

The second rib, *c* 2, is much longer than the first; it is not at all twisted on itself, and its angle is but slightly marked.

The eleventh and twelfth ribs are very short; they have neither angle, tubercle, nor groove on their inferior border, and their heads have but one articulating surface.



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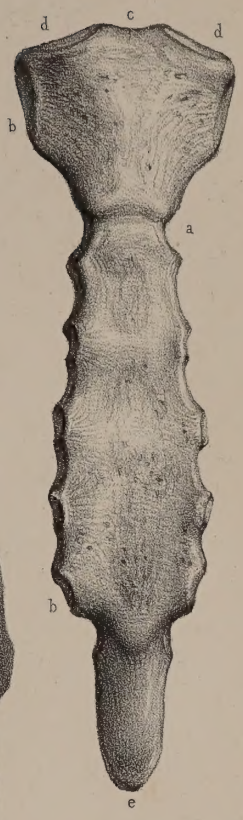

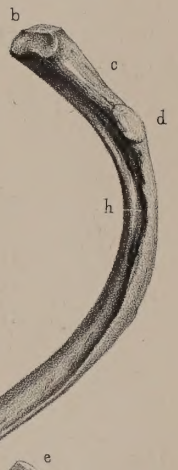

Fig. 4.

Fig. 3.

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Pl. 7.

Fig. 1.

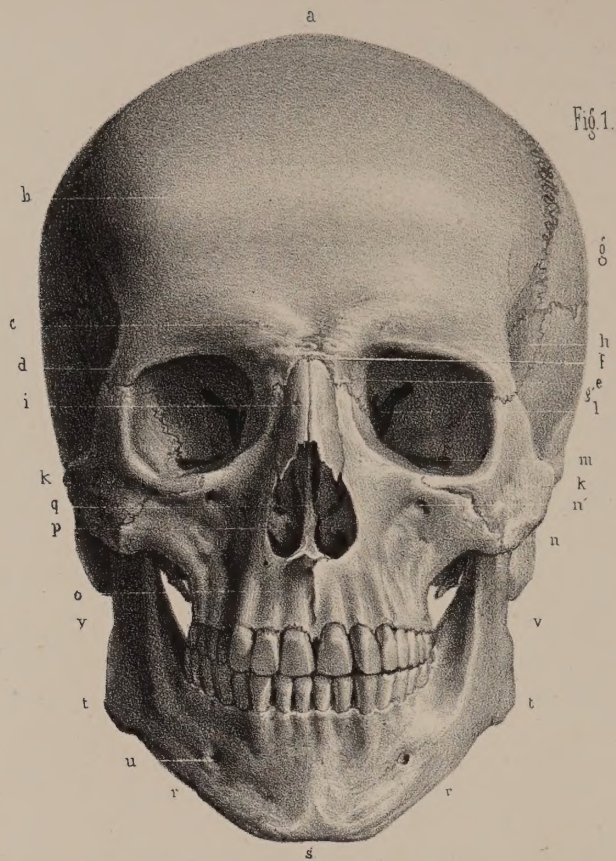

Fig. 2

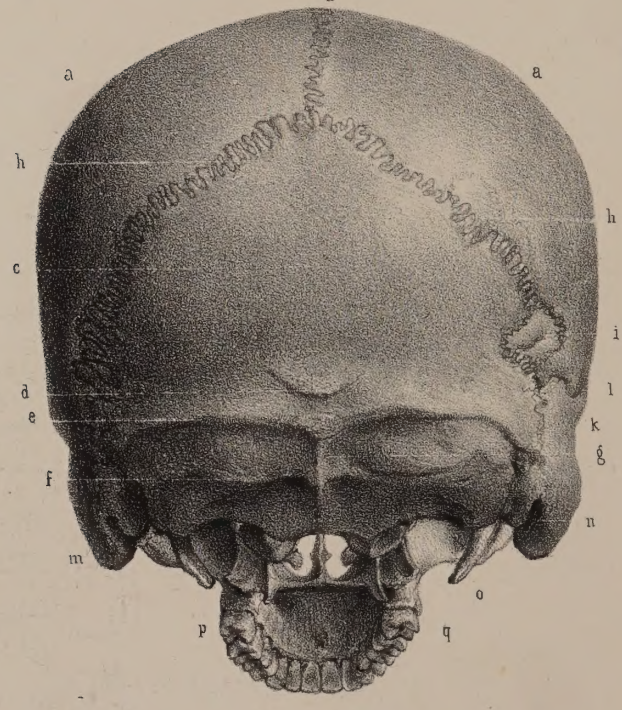

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PLATE VII.

APPARATUS OF LOCOMOTION.—THE BONES.

THE SKULL.

ANTERIOR OR FACIAL REGION.

Fig. 1. *a*, Os frontis; *b*, frontal prominence; *c*, superciliary ridge; *d*, external orbitary process; *e*, internal orbitary process; *f*, naso-frontal suture; *g*, anterior portion of the parietal bone; *g'*, anterior portion of the temporal bone; *h*, great wing of the sphenoid; *i*, os nasi; *k*, malar bone; *l*, cavity of the orbit and sphenoidal fissure; *m*, spheno-maxillary fissure; *n*, fossa canina; *d'*, suborbitary hole; *o*, inferior margin of the superior maxillary bone furrowed by the alveoli which contain the teeth; *p*, anterior outlet of the nostrils; *q*, septum narium; *r*, *r*, body of the superior maxillary bone; *s*, symphysis menti; *t*, *t*, angle of the jaw; *u*, foramen menti; *v*, *v*, rami of the lower jaw.

POSTERIOR REGION.

Fig. 2. *a*, *a*, parietal bones; *b*, saggital or interparietal suture; *d*, external occipital protuberance; *e*, superior crucial occipital ridge; *f*, inferior crucial ridge; *h*, lambdoidal suture; *i*, an os Wormianum *s.* triquetrum; *k*, mastoid portion of the temporal bone; *l*, temporo-parietal or posterior part of the squamous suture; *m*, mastoid process; *n*, digastric furrow; *o*, styloid process; *p*, *q*, superior maxillary bone.

PLATE VIII.

APPARATUS OF LOCOMOTION.—THE BONES.

THE SKULL.

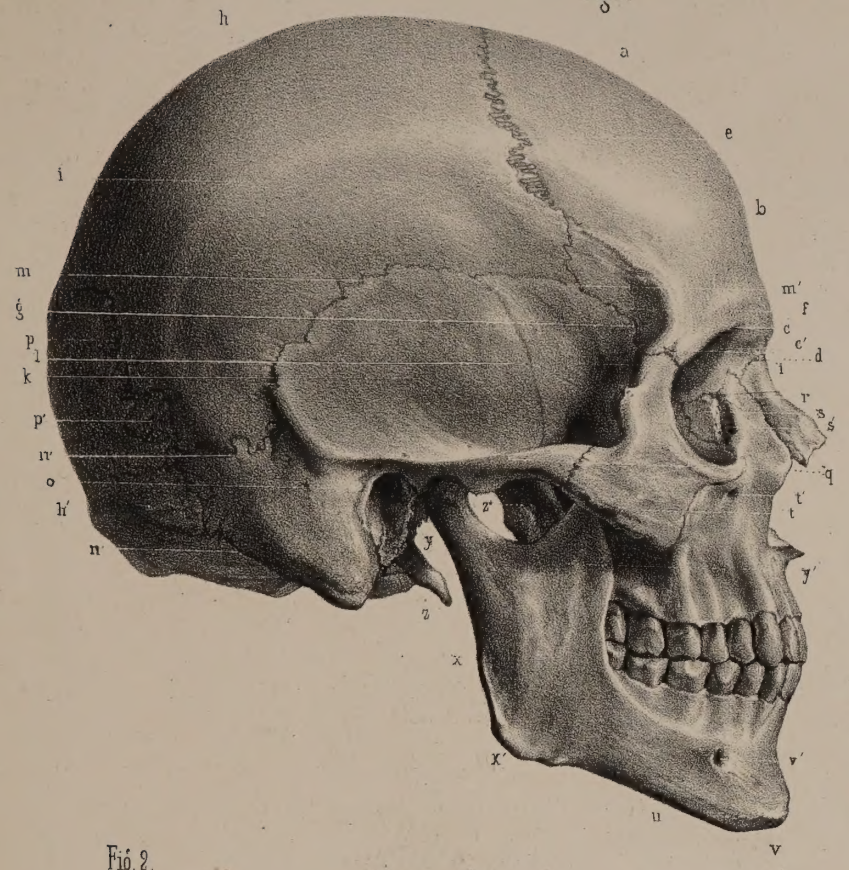
LATERAL REGION.

Fig. 1, *a*, Os frontis; *b*, frontal prominence; *c*, superciliary ridge; *c'*, external orbitary process, and fronto-malar suture; *d*, fronto-nasal suture; *e*, fronto-parietal suture; *f*, temporal fossa where formed by the os frontis; *g*, fronto-sphenoidal suture; *h*, parietal bone; *h'*, occipital bone; *i*, semicircular line for the attachment of the temporal muscle; *j*, great ala of the sphenoid bone; *k*, squamous portion of the os temporis; *l*, spheno-temporal suture; *m*, temporo-parietal suture; *n*, mastoid portion of the temporal; *n'*, posterior part of the temporo-parietal suture, which runs to join the lambdoidal suture; *o*, meatus auditorius externus; *p*, *p'*, lambdoidal suture; *q*, zygomatic arch; *r*, ascending or nasal process of the superior maxillary; *s*, os unguis; *s'*, lacrymal groove or canal; *t*, malar bone; *t'*, infra-orbitary hole; *u*, body of the lower jaw bone; *v*, symphysis menti; *v'*, foramen menti and external oblique line; *x*, ramus of the lower jaw; *x'*, angle of the lower jaw; *y*, condyle; *y'*, coronoid process; *z*, styloid process; *z'*, pterygoid process.

SUPERIOR REGION.

Fig. 2. *a*, Os frontis; *b*, *b*, parietals; *c*, os occipitis; *d*—*d*, fronto-parietal or coronal suture; *e*, sagittal suture; *f*, lambdoidal suture.

Fig. 1.



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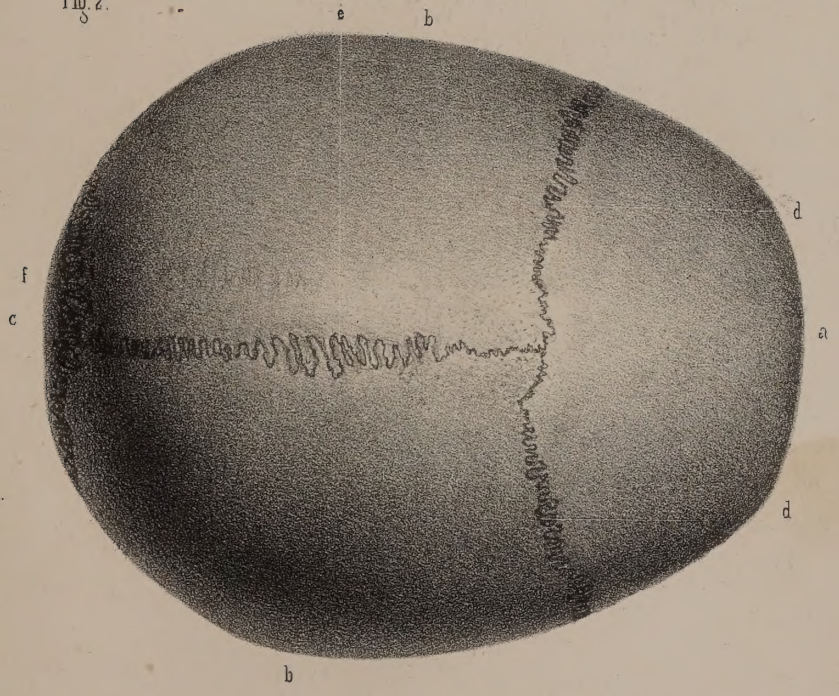

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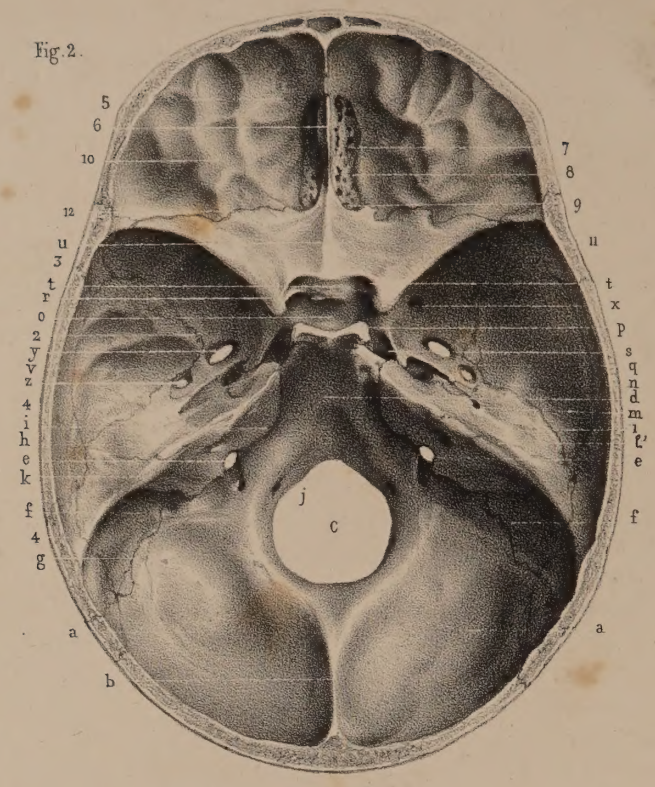
Fig. 2.



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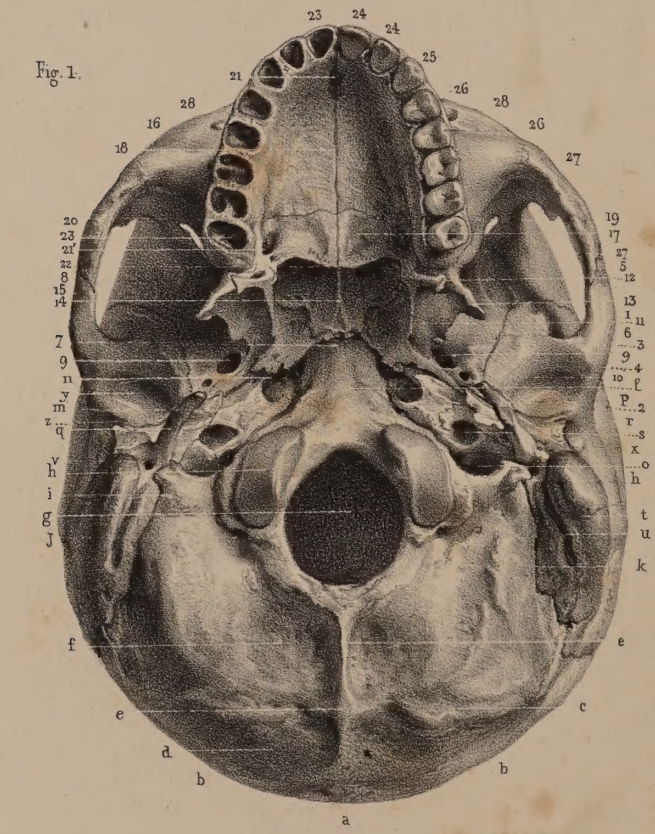

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PLATE IX.

APPARATUS OF LOCOMOTION.—OSTEOLOGY.

BASILAR REGION OF THE SKULL.

Fig. 1. *a*, external occipital protuberance; *b b*, superior occipital curved or crucial line; *c c*, inferior occipital curved or crucial line; *d*, space contained between the two curved lines; *e—e*, spine or external occipital crest; *f*, depressions; *g*, occipital foramen; *h h*, condyle of the occipital bone; *i*, jugular eminence; *j*, condyloid fossa and posterior condyloid foramen; *k*, lambdoidal suture; *l*, basilar surface; *m*, petro-occipital fissure; *n*, foramen lacerum anterius seu basis cranii; *o*, foramen lacerum posterius; *p*, inferior aspect of the pars petrosa; *q*, styloid process; *r*, processus vaginalis processus styloidei; *s*, inferior orifice of the carotid canal; *t*, mastoid process; *u*, groove for the digastric muscle; *v*, stylo-mastoid foramen; *x*, meatus auditorius externus or external auricular canal; *y*, glenoid cavity divided into two parts, by the glenoid fissure or Glaserian fissure, *z*; 1, zygomatic process; 2, its longitudinal root; 3, its transverse root; 4, tubercle that separates the two roots; 5, articulation of the zygomatic process with the malar bone; 6, temporo sphenoidal suture; 7, body of the sphenoid bone; 8, large wing of the sphenoid; 9 oval or superior maxillary foramen; 10, foramen spinosum, the small round or spheno-spinous foramen; 11, pterygoid process and pterygoid fossa; 12, internal wing of the sphenoid; 13, external ala of the pterygoid process; 14, septum narium, partition of the nasal fossæ formed by the vomer; 15, posterior orifice of the nasal fossæ of each side; 16—17, palatine arch formed by the palatine processes of the superior maxillary bone, and by the horizontal portion of the two palatine bones; 18, the suture uniting the two palatine apophyses; 19, the suture that unites the two palatine bones; 20, the suture that unites the horizontal portion of the palatine bone to the palatine process of the superior maxillary; 21, anterior palatine canal; 21', posterior palatine canal; 22, posterior nasal spine; 23, alveolar border of the superior maxillary bone, marked by the cavities that bear the name of alveolæ; 24—24, incisor teeth; 25, canine tooth; 26—26, small molar teeth; 27, large molar; 28, malar bone.

BASE OF THE CRANIUM INTERNALLY.

Fig, 2, *a*, inferior occipital fossæ; *b*, internal occipital spine; *c*, occipital foramen; *d*, basilar gutter; *e*, posterior lacerated foramen; *f f*, lateral gutters; *g*, occipito-mastoid suture; *h*, internal auditory foramen; *i*, petro-occipital fissure; *j*, anterior condyloid foramen; *k*, superior face of the pars petrosa ossis temporis; *l*, superior petrous gutter; *m*, Fallopian hiatus; *n*, furrow that lodges a nerve; *o*, pituitary fossa; *p*, posterior clinoid process; *q*, cribriform plate; *r*, anterior clinoid process; *s*, cavernous gutter, lodging the cavernous sinus; *t*, optic canal and gutter; *u*, olfactory depression; *v*, middle fossa of the cranium; *x*, foramen rotundum; *y*, foramen ovale; *z*, foramen spinosum; 1, vascular furrow; 2, spheno-temporal suture; 3, spheno-parietal suture; 4 4, temporo-parietal suture; 5, foramen cœcum; 6, crista galli; 7, ethmoidal gutter; 8, ethmoido-frontal suture; 9, ethmoido-sphenoidal suture; 10, orbitary plate of the frontal bone; 11, small wings of the sphenoid; 12, suture that unites the frontal to the small wings of the sphenoid.

PLATE X.

APPARATUS OF LOCOMOTION.—OSTEOLOGY.

BONES OF THE HEAD.

Fig. 1, internal aspect of the frontal bone: *a*, longitudinal groove: *b*, frontal crest; *c*, foramen cœcum. *d*, frontal protuberance: *e*, ethmoidal notch: *f*, opening of the frontal sinuses: *g g*, superior or parietal margin of the bone: *h h*, inferior or sphenoidal border; *i i*, external orbital apophyses.

Fig. 2, inferior aspect of the frontal bone: *a*, ethmoidal notch: *b*, nasal spine: *c*, openings of frontal sinuses; *d d*, borders of the ethmoidal notch indented with little depressions corresponding to those of the ethmoid: *e*, orbitary arch; *f*, lachrymal fossa: *g*, superciliary ridge: *h*, superciliary foramen: *i*, external orbital process, which articulates with the malar bone: *j j*, inferior sphenoidal border of the bone.

Fig. 3, internal aspect of the right parietal: *a*, parietal protuberance: *b b b*, vascular furrows: *c c c*, rough depressions, and longitudinal groove: *d—d*, superior or sagittal border: *e e*, inferior or temporal border: *f f*, anterior or frontal border: *g g*, posterior or occipital border.

Fig. 4, internal aspect of the occipital bone; *a*, internal margin of the occipital foramen: *b*, basilar gutter: *c*, projection of the anterior condyloid canal; *d d*, superior occipital fossæ: *e e*, inferior occipital fossæ: *f*, end of the longitudinal groove: *g g*, lateral grooves: *h*, internal occipital tuberosity: *i*, internal occipital ridge: *j j*, superior or parietal borders: *k k*, inferior borders divided into two portions by the jugular eminence: *l*, that part of the border situated above the jugular eminence, articulating with the mastoid portion of the temporal; the part situated beneath articulates by juxtaposition with the petrous portion of the temporal: *m*, notch which helps to form the foramen lacerum posterius: *n*, the superior angle: *o*, the anterior truncated angle which is articulated to the body of the sphenoid.

Fig. 5, internal aspect of the right temporal: *a*, internal surface of the squamous portion: *b*, vascular furrow: its circumference, *c—d*, bevelled off at the expense of the internal table in the two posterior thirds, is articulated with the parietal; that circumference, bevelled at the cost of the external table in its anterior third, *c—e*, is articulated with the sphenoid: *f*, internal surface of the mastoid portion: *g*, end of the lateral gutter; the circumference, *h h*, of the mastoid portion is articulated with the parietal and occipital: *i*, the petrous portion: *j*, internal auditory foramen: *k*, styloid process: *l*, mastoid process: *m*, zygomatic process.

Fig. 6, anterior aspect of the right temporal: *a*, mastoid portion: *b*, squamous portion: *c*, petrous portion: *d*, Fallopian hiatus: *e*, carotid canal: *f*, zygomatic apophysis: *g*, mastoid apophysis: *h*, styloid apophysis.

Fig. 7, posterior aspect of the right malar bone: *a*, smooth surface forming part of the temporal fossa; *b*, rough surface which articulates with the malar apophysis of the superior maxillary bone: *c*, superior or orbital face: *d*, superior or orbital border: *e*, inferior border; *f*, anterior or maxillary border: *g*, posterior border.

Fig. 8, ethmoidal bone seen on its superior surface: *a*, cribriform plate and ethmoidal sulci: *b*, the crista galli: *c*, depressions corresponding to those of the ethmoidal notch of the frontal bone: *d*, the papyraceous plate or os planum: *e*, perpendicular plate of the ethmoid.

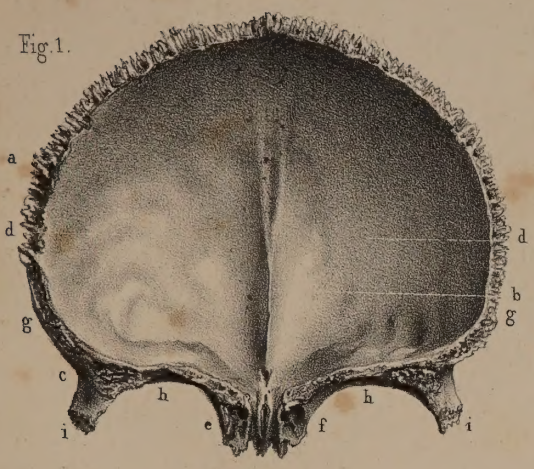
Fig. 9, the ethmoid seen on its inferior face: *a*, perpendicular plate: *b*, superior turbinated bone: *c c*, middle turbinated bone: *d*, superior meatus: *e*, unciform apophysis.

Fig. 10, ethmoidal bone seen on the posterior surface: *a*, perpendicular plate: *b*, superior turbinated or spongy bone; *c*, middle spongy bone: *d*, superior meatus: *e*, unciform apophysis.

Fig. 11, superior face of the sphenoid bone. The body of the sphenoid: *a*, olfactory depression: *b*, optic gutter and foramen: *c*, sella turcica or pituatary fossa: *d*, cavernous gutter: *e*, quadrilateral plate: *f*, quadrilateral surface, which articulates with the basilar apophysis of the occipital: *g g*, small wings of the sphenoid, the summit of which bears the name of ensiform appendix: *i i*, anterior clinoid processes: *j j*, posterior clinoid processes: *k*, superior face of the large wings of the sphenoid: *l*, the large round or superior maxillary foramen: *m*, oval or inferior maxillary foramen: *n*, small round or spheno-spinous foramen: *o*, Vidian canal: *p p*, pterygoid processes; *q*, sphenoidal fissure: *r r*, internal border of the large wings, the upper half of this border articulates with the frontal bone, the lower half makes part of the sphenoidal fissure, completed by the little wings: *s s*, external border of the large wings, which articulates with the frontal bone.

Fig. 12, inferior aspect of the sphenoid. Body of the sphenoid: *a* sphenoidal ridge: *b*, beak of the sphenoid: *c*, opening of the sphenoidal sinuses: *d*, pterygo-palatine canal: *e e*, pterygoid processes: *f*, internal wing: *g*, external wing: *h*, notch that receives the tuberosity of the palate bone: *i*, Vidian canal: *j*, anterior or orbital face of the large wings of the sphenoid, the superior border, *k*, articulates with the frontal, the internal border, *l*, makes part of the sphenoidal fissure, the inferior border, *m*, makes part of the spheno-maxillary fissure, the external border, *n*, articulates with the malar bone: *o*, external face of the greater wings: *p*, anterior border of the smaller wings, which articulates with the ethmoid and the frontal: *q*, optic foramen: *r*, sphenoidal fissure: *s*, large round foramen.

Fig. 1.



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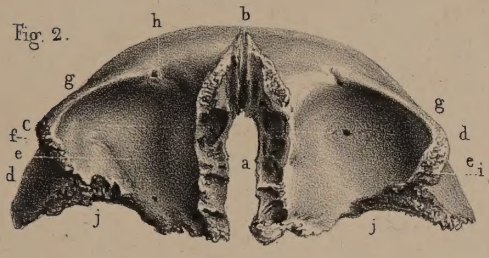

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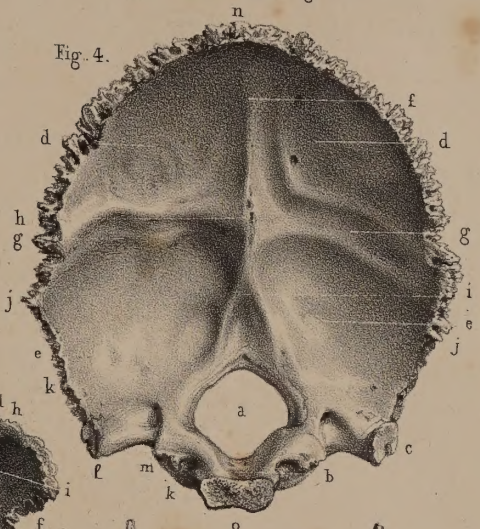

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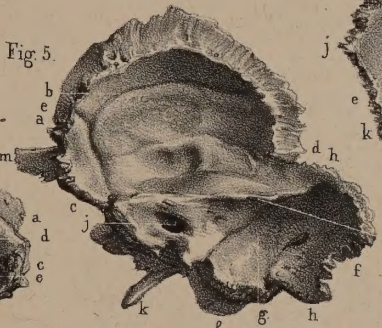

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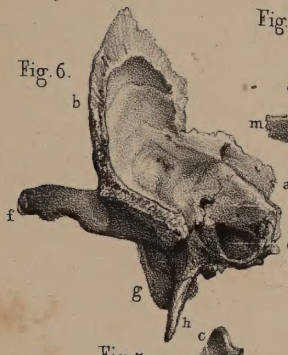

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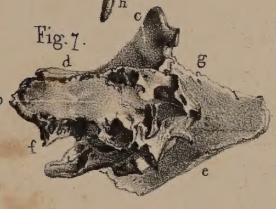

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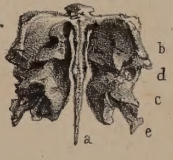
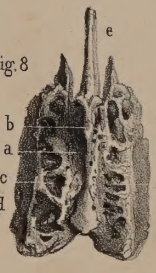


Fig. 9.

Fig. 8



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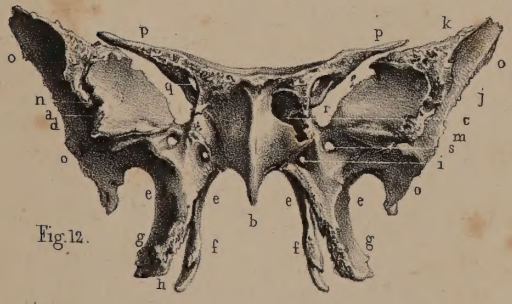

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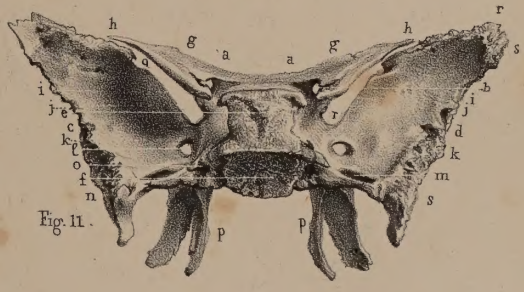

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Pl. II.

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PLATE XI.

APPARATUS OF LOCOMOTION—THE BONES.

BONES OF THE FACE.

Fig. 1, Superior maxillary bone of the right side from its external aspect; *a*, fossa canina; *b*, sub-orbitary foramen—orifice of the sub-orbitary canal; *c*, tuber maxillare; *d*, outer aspect of the ascending process of the superior maxillary bone; *e*, anterior edge of the same process, which articulates with the os nasi; *f*, posterior edge of the process, hollowed out by a groove, the lachrymal groove; *g*, apex of the ascending process, which articulates with the os frontis; *h*, orbitary or superior aspect of the os maxillare superius; *i*, sub-orbitary canal; *j*, external edge of the orbitary aspect; it forms part of the spheno-maxillary fissure; *k*, internal edge which articulates with the os unguis, the ethmoidal and the palatine bones; *l*, anterior edge which forms part in the circle of the orbit; *m*, malar process, rough surface which articulates with the malar bone; *n*, nasal spine; *o*, notch which concurs in the formation of the nasal fossæ; *p—p*, inferior or alveolary edge of the superior maxillary bone; *q—q*, posterior edge, which articulates with the os palati.

Fig 2, Superior maxillary bone of the right side seen from its internal aspect; *a*, palatine process; *b*, foramen incisivum or anterior palatine canal. The internal aspect of the ascending process presents a rough surface, *c*, which concurs in the formation of the anterior ethmoidal cells; a ridge, *d*, which articulates with the middle turbinated bone; a smooth surface, *e*, which forms part of the middle meatus of the nasal fossæ; another horizontal ridge which supports the inferior turbinated bone; *g*, lachrymal or naso-lachrymal groove; *h*, concave surface, forming part of the inferior meatus; *i*, antrum thighmorianum, or maxillary sinus; *j*, cells articulating with the ethmoidal bone; *k*, groove forming part of the posterior palatine canal.

Fig. 3, Malar bone of the right side seen on its posterior aspect; *a*, smooth surface forming part of the temporal fossa; *b*, malar hole; *c*, superior or orbitary aspect.

Fig. 4, Palatine bone of the right side, external aspect; *a*, sphenoidal process; *b*, orbitary process; *c*, spheno-palatine hole; *d*, pyramidal process; *e*, posterior palatine canal; *f*, pterygo-palatine canal.

Fig. 5, Palatine bone of the right side, internal aspect; *a*, sphenoidal process; *b*, orbitary process; *c*, spheno-palatine hole; *d*, pyramidal process; *e*, horizontal plate; *f*, ridge articulating with the middle spongy or turbinated bone; *g*, surface which forms part of the middle meatus; *h*, crest articulating with the inferior spongy bone; *i*, groove entering into the constitution of the inferior meatus.

Fig. 6, Palatine bone of the right side, posterior aspect; *a*, orbitary process; *b*, sphenoidal process; *c*, pyramidal process; *d*, horizontal lamina; *e*, posterior nasal spine.

Fig. 7, Vomer or share bone; *a* superior margin, notched for the reception of the inferior crista of the os-sphenoides; *b*, inferior margin, articulating with the palatine and superior maxillary bones; *c*, anterior margin, articulating with the perpendicular lamina of the ethmoidal; *d*, posterior margin.

Fig. 8, Os nasi, external aspect. The superior margin, *a*, articulates with the os frontis; the inferior, *b*, enters into the contour of the anterior orifice of the nostrils; the outer margin, *c*, articulates with the ascending process of the os maxillare superius; the inner margin, *d*, concurs with the bone of the opposite side to form a notch which receives the nasal spine of the frontal bone, and the perpendicular plate of the ethmoidal bone.

Fig. 9, Os unguis of the right side, external aspect. This aspect is divided into two portions by a vertical ridge: *a*, the anterior portion, grooved by the lachrymal canal; *b*, the posterior portion which enters into the formation of the internal paries of the orbit.

Figs. 10 and 11, Inferior spongy or turbinated bone of the right side. Fig. 10, external aspect. Fig. 11, internal aspect; *a*, superior margin; *b*, lachrymal process; *c*, auricular process; *d*, inferior margin; *e*, anterior extremity; *f*, posterior extremity.

Fig. 12, Lower jaw, or inferior maxillary bone, seen from behind; *a*, apophysis menti seu geni; *b*, line marking the insertion of the mylo-hyoideus muscle; *c*, superior or alveolary margin; *d—d*, inferior margin or base of the lower jaw; *e—e*, rami of the lower jaw; *f*, superior orifice of the inferior dental canal; *g—g*, angles of the jaw; *h—h*, condyles; *i*, neck of the condyle; *j*, coronoid process; *k*, sigmoid notch.

Eig. 13, Nasal fossæ; external walls; *a*, superior spongy bone; *b*, superior meatus; *c*, spheno-palatine hole; *d*, middle spongy bone; *e*, middle meatus, entrance of the maxillary sinus; *f*, course of the lachrymal canal, which opens upon the inferior meatus; *g*, inferior spongy bone; *h—h*, inferior meatus; *i*, *j*, floor of the nasal fossæ, formed anteriorly by the superior maxillary bone, posteriorly by the palatine bone; *k*, *l*, *m*, roof of the nasal fossæ, formed anteriorly by the ossa nasi, *k*; in the middle by the cribriform plate of the ethmoidal, *l*; posteriorly by the body of the sphenoidal, *m*; *n*, *n*, anterior orifice of the nasal fossæ; *o o*, posterior orifice of the nasal fossæ; *p*, sphenoidal sinus; *q*, frontal sinus.

Fig. 14, Nasal fossæ; internal walls; *a*, *b*, septum narium formed by the perpendicular plate of the ethmoidal, *a*, and by the vomer, *b*; *c*, suture between the vomer and the perpendicular plate of the ethmoidal; *d*, *e*, articulations or sutures between the vomer and the superior maxillary bone anteriorly, and the palatine bone posteriorly; *f*, anterior orifice of the nasal fossæ; *g*, superior spongy bone; *h*, anterior edge of the perpendicular plate of the os æthmoides; *i*, frontal sinus; *j*, crista galli; *k*, *l*, body of the os sphenoides: *m*, sphenoidal sinus.

Figs. 15, 16, and 17, Os hyoides. Fig. 15, anterior aspect. Fig. 16, posterior aspect. Fig. 17, lateral aspect; *a*, body; *b*, *b*, greater cornua; *c c*, smaller cornua.

PLATE XII.

APPARATUS OF LOCOMOTION—THE LIGAMENTS.

Fig. 1, The cephalo-spinal articulation; *A*, basilar process; *B*, pars petrosa; *C*, styloid process; *C—C*, transverse processes of the atlas; *D—D*, transverse processes of the axis.

1—2, anterior occipito-atlantal ligament, composed of two fasciculi; one superficial, the other profound. The superficial fasciculus, 1, arises from the basilar process, whence its fibres proceed diverging to be inserted into the superior margin of the anterior arch of the atlas; the middle fibres unite into a cylindrical cord, which extends between the basilar process and the tubercle of the anterior arch of the atlas, and body of the axis. The deep fasciculus, 2, extends from the jugular eminence and inferior aspect of the petrous portion to the anterior arch of the atlas; its fibres interlace with those of the anterior fasciculus; 3, lateral occipito-atlantal ligament, extending from the pars petrosa to the base of the transverse process of the atlas; 4, hole which transmits the jugular vein; 5, hole which gives passage to the nerves issuing from the foramen lacerum posterius; 6, anterior atlo-axoid ligament, passing from the tubercle of the anterior arch of the atlas to the body of the axis; it is continued inferiorly with the anterior common vertebral ligament; 7, tendon of the longus colli muscle.

Fig. 2, Cephalo-spinal articulation; *A—A*, Os occipitis; *B—B*, Transverse processes of the atlas; *C—C*, Transverse processes of the axis.

1—2, 2', Posterior occipito-atloid ligament; origin from the edge of the occipital hole; insertion into the posterior arch of the atlas; its fibres decussate in the median line; 3, hole for the passage of the vertebral artery; 4, posterior atlo-axoid ligament, extending between the inferior margin of the posterior arch of the atlas and the laminæ of the axis. This ligament represents the ligamentum nuchæ in its rudimentary state.

Fig. 3, Cephalo-spinal articulation,—section: *A—A*, inferior fossæ of the os occipitis; *B—B*, transverse processes of the atlas.

1, occipito-axoid ligament; attached superiorly to the basilar sulcus and inferior fossæ of the occipital bone; it is continuous with the posterior common vertebral ligament, 2; 3—3, fibrous capsules surrounding the condyles of the os occipitis and the superior articular surfaces of the atlas; 4—4, fibrous capsules surrounding the articular surfaces between the atlas and axis.

Fig. 4, Cephalo-spinal articulation; 1, occipito-axoid ligament, divided at the level of the occipital foramen. It consists of three layers the posterior of which, 2, is continuous with the corresponding common vertebral ligament, the middle, 3, is attached to the body of the axis, and the third, which is very thin, terminates in the ligamentum transversum, 5—5, which extends between one of the lateral masses of the atlas and the other, behind the odontoid process of the axis. From its upper edge a slip extends upwards, 4, to be attached to the edge of the foramen magnum, and from its lower edge a corresponding slip passes downwards, 6, to be attached to the body of the axis; 7—7, lateral odontoid ligaments, stretching from the apex of the odontoid process to the internal parts of the condyle of the os occipitis. The middle odontoid ligament comprises a few fibres which from the apex of the odontoid process extend to the anterior edge of the foramen magnum.

Fig. 5—8, Spinal or vertebral articulations. Fig. 5, 1—2—3, posterior common vertebral ligament, extending from the os occipitis to the last lumbar vertebra upon the posterior aspect of the bodies of the vertebræ. Narrow opposite the bodies of the several vertebræ, it expands opposite each of the intervertebral spaces; 7—7, intervertebral cartilages, consisting of oblique fibres regularly arranged.

Fig. 6, 1—3, Ligamenta flava, ligamenta sub-flava, connecting the laminæ of the vertebræ.

Fig. 7, 1—2, Supra-spinal ligaments extending from one to another of the spinous processes; 3—4, capsular ligaments of the articular processes.

Fig. 8, Interspinal ligaments filling the spaces between the spinous processes. They are composed in great part of the tendons, 3—4, of the long muscles of the back. These ligaments only occur in the lumbar region.

Fig. 9—11, Costo-spinal articulations. Fig. 9, *A—A*, ribs; *B—B*, bodies of the dorsal vertebræ. 1—2—3, ligamentum radiatum, extending from the anterior aspect of the shoulder of the rib in a radiated manner to the bodies of the vertebræ above and below, with which it articulates; 4—4, ligamentum costo-transversum superius; 5—5, ligamentum vertebrale anterius commune.

Fig. 10, *A—A*, transverse processes; *B—B*, ribs; 1—1, posterior transverso-costal ligament, passing from the apex of the transverse process to the tuber of the rib; 2—2, superior transverso-costal ligament, passing from the inferior margin of the transverse process and from the overlying vertebral lamina to the neck of the rib below. It generally consists of either two or three fasciculi; 3—3, ligamenta sub-flava; 4—4, supra-spinal ligaments.

Fig. 11, *A*, Vertebra; *B—B*, section of two ribs. 1, Interosseous transverso-costal ligament, extending from the outer aspect of the transverse process to the neck of the rib. The small fasciculus indicated by, 2, extends from the head of the rib to the edge of the articular process of the body of the vertebra and the intervertebral disc; 3, horizontal section of an intervertebral disc, formed of concentric fibrous laminæ, and presenting in its centre a soft and spongy substance.

Fig. 1.

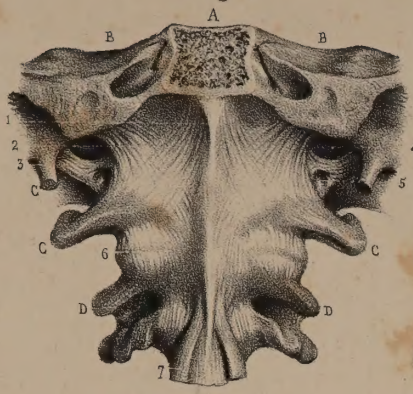
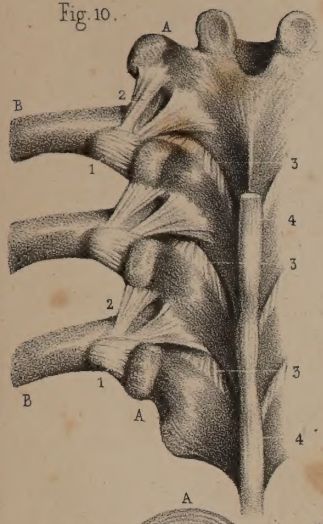


Fig. 10.



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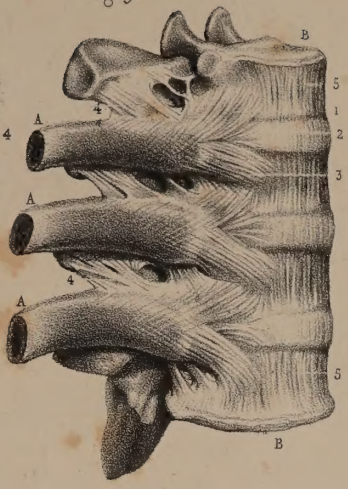

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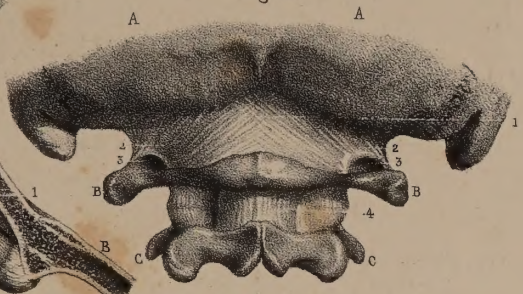

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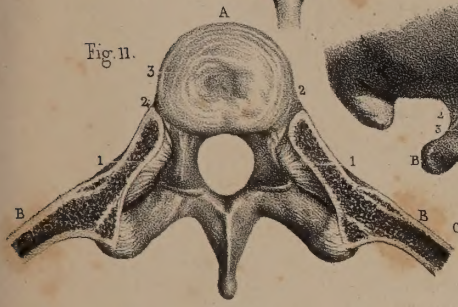

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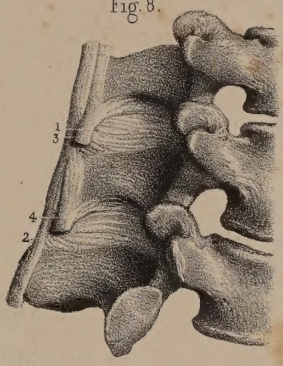

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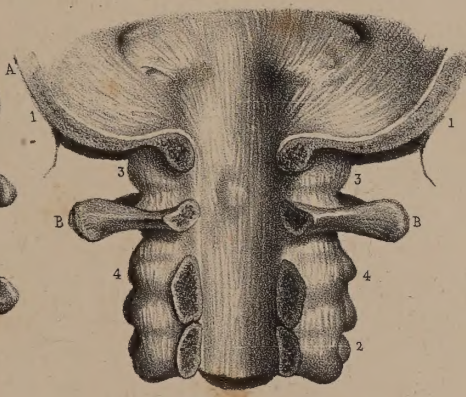

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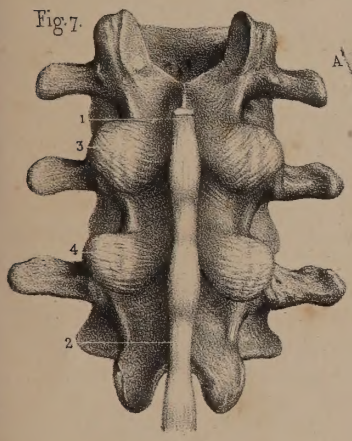

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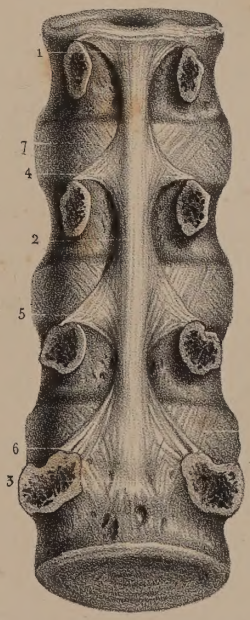

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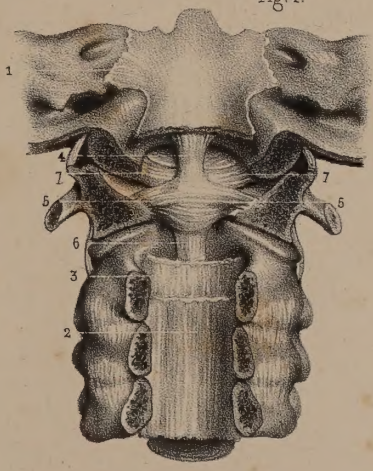

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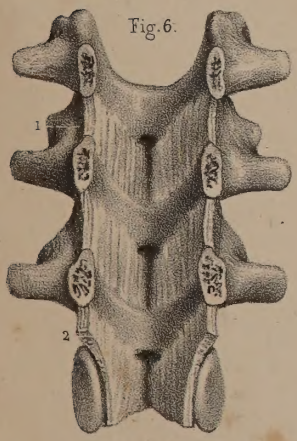

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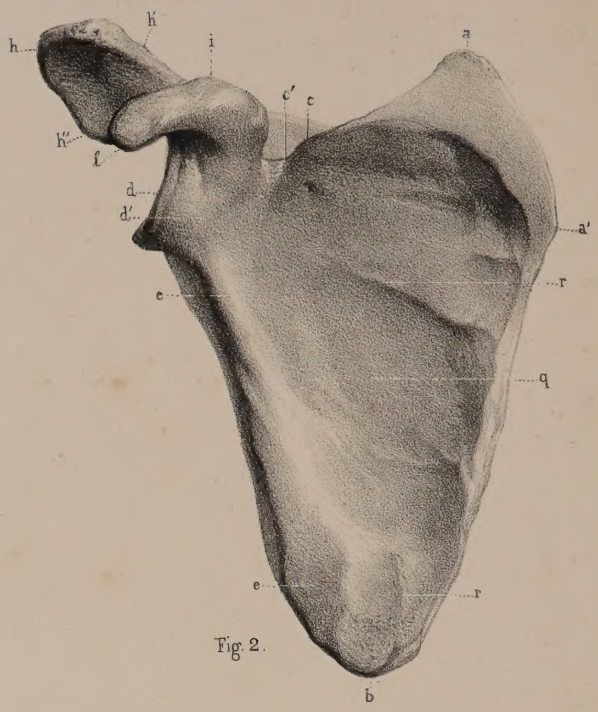
Fig. 4.



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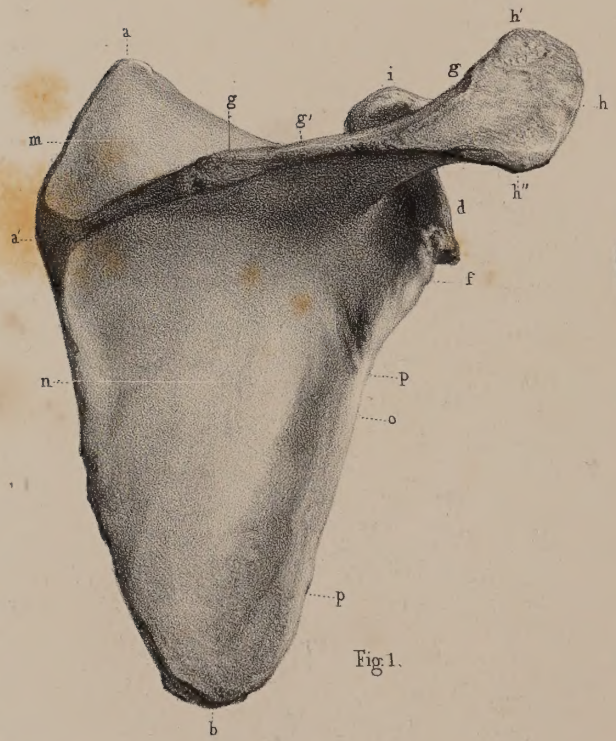

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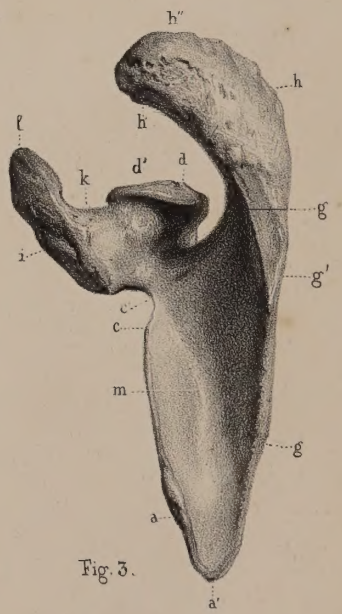

Fig. 3.

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PLATE XIII.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE SUPERIOR EXTREMITY.

THE SUPERIOR EXTREMITY IS COMPOSED OF FOUR PARTS: FIRST, THE SHOULDER: SECOND, THE ARM: THIRD, THE FORE-ARM: FOURTH, THE HAND.

I. THE SHOULDER.

The shoulder is composed of two bones, the scapula and the clavicle.

THE SCAPULA.

Fig. 1. The posterior surface or dorsum of the right scapula. Fig. 2. The anterior surface of the same. Fig. 3. The superior aspect of the same. Fig. 4. The anterior border or costa.

a, figs. 1, 2, 3, superior angle; *b*, figs. 1, 2, 4, inferior angle; *d*, figs. 1, 2, 3, 4, anterior angle, having a cavity called the glenoid cavity; *d*, figs. 3 and 4, which articulates with the head of the humerus; *d'*, figs. 2 and 3, neck of the scapula; *a*—*b*, figs. 1 and 2, posterior border (or base) of the scapula; an obtuse angle *a'*, separates its superior fourth *a*—*a'*, from the three inferior fourths *a'*—*b*; *a*—*c*, figs. 2 and 3, superior or cervical border; *c'*, the notch; *b*—*d*, figs. 1, 2, 4, the anterior or axillary border; this border, which is much thicker than the others, is separated into two ridges by a groove which is more or less deep; *e*—*e*, figs. 2 and 4, internal ridge of the anterior border; *e'*—*e'*, fig. 4, external ridge; *f*, figs. 1, 4, a rough surface, giving origin to the long head of the triceps; *g*, figs. 1 and 3, spine of the scapula; its posterior edge is very thick, and is divided into two ridges; *g*, figs. 1 and 3, the superior ridge; *g'*, the inferior ridge; it has at *a'*, fig. 1, a small flat triangular surface; *h*, figs. 1, 2, 3, 4, the acromion process; *h'*, figs. 1, 2, 3, its superior border, and articulating surface for the outer end of the clavicle; *h''*, its inferior border; *i'*, figs. 1, 2, 3, 4, the coracoid process; *k*, figs. 3 and 4, its base; *l*, its apex; *m*, figs. 1, 3, 4, supra-spinous fossa, formed in a great measure by the upper surface of the spine; *n*, fig. 1, infra spinous fossa; it has a long depression *o*, bounded anteriorly by a vertical crista or crest *pp*; *q*, fig. 2, venter or infrascapular fossa; *rr*, depressions and ridges on its surface.

PLATE XIV.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE SUPERIOR EXTREMITY.

THE CLAVICLE.

Fig. 1. Superior surface of the right clavicle; *a*, the body; *b*, the inner end; *c*, the outer end; *d*, the posterior edge.

Fig. 2. Inferior surface of the right clavicle; *a*, the body; *b*, the inner end; it has an articulating surface for the sternum; *c*, the outer end; it has a small surface that articulates with a corresponding surface on the anterior border of the acromion; *d*, the posterior border; *e*, a rough surface giving attachment to the costo-clavicular ligament; *g*, a depression for the subclavius muscle; *f*, a ridge having a rough surface for the insertion of the ligaments that unite the clavicle to the coracoid process.

Fig. 3. Anterior border of the right clavicle; *a*, the body; *b*, the inner or sternal end; *c*, the outer or acromial end; *e*, a rough surface.

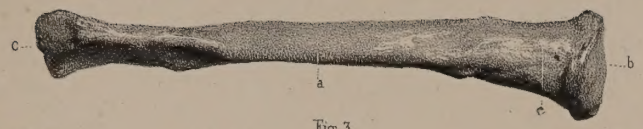
II. THE ARM.

THE HUMERUS.

Fig. 4. Anterior aspect of the right humerus.

Fig. 5. Posterior aspect of the same.

Figs. 4 and 5. *a*, the body; *b*, the superior extremity; *c*, the inferior extremity; *d*, the head of the humerus, which articulates with the glenoid cavity of the scapula; *ee*, the neck of the humerus; *f*, fig. 4, the lesser tubercle of the humerus, with a surface for the insertion of the subscapularis muscle; *g*, figs. 4 and 5, the greater tubercle, it has three surfaces for the insertion of muscles; *h i*, fig. 5; *k l*, fig. 4, the bicipital groove; *m*, its anterior border, is elevated and rough, and seems to be a prolongation of the greater tubercle; inferiorly it is lost in the rough surface for the insertion of the deltoid muscle, *o*, figs. 4 and 5; *n*, fig. 4, its posterior border is less elevated and is shorter, and may be considered as a prolongation from the lesser tubercle; *pp*, figs. 4 and 5, spiral groove; *qq*, the external condyle; *rr*, the internal condyle; *s*, fig. 4, the articulating surface for the head of the radius; *t*, figs. 4 and 5, the trochlea; *v*, fig. 5, the olecranon fossa; *u*, fig. 4, the coronoïd fossa; *x*, fig. 4, a small depression above the articulating process for the radius.



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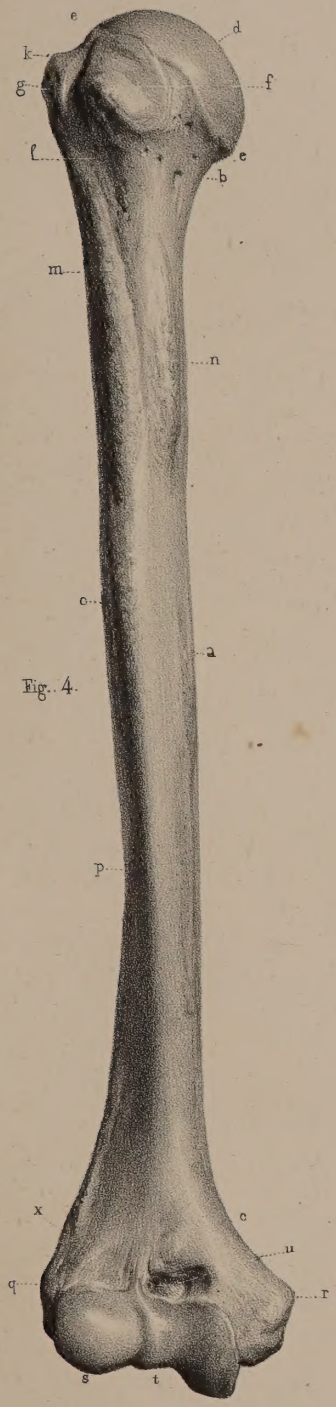

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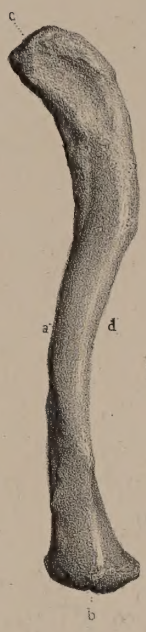

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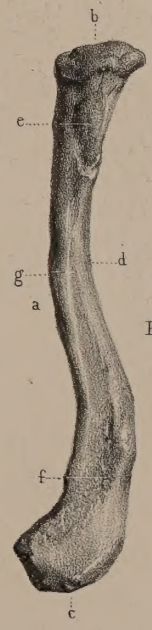

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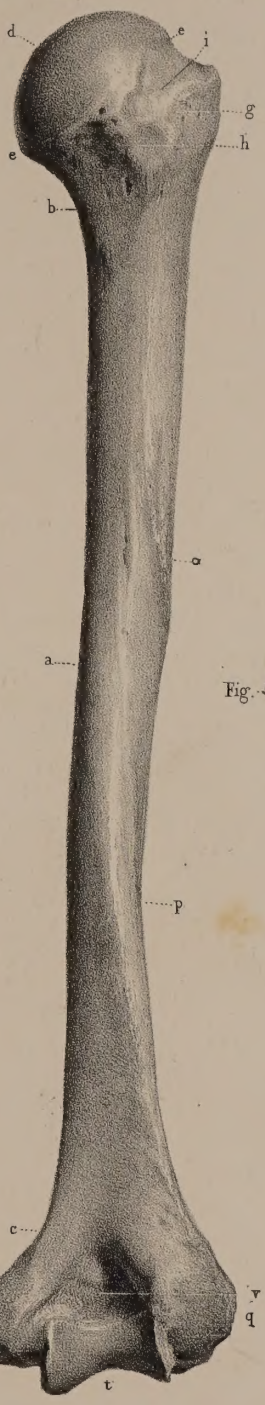

Fig. 5.

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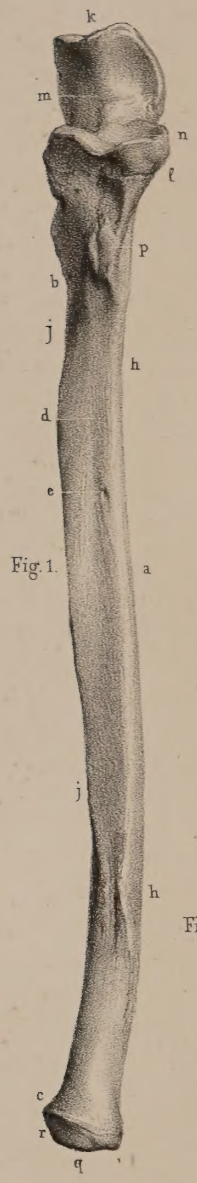

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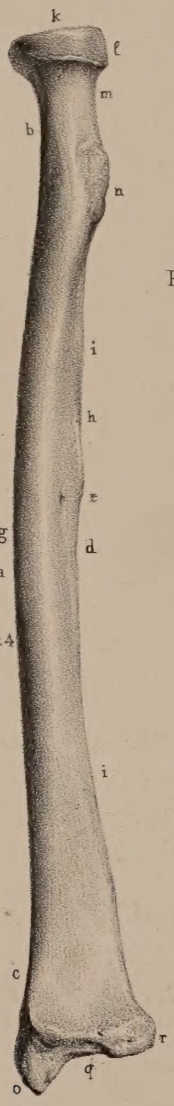

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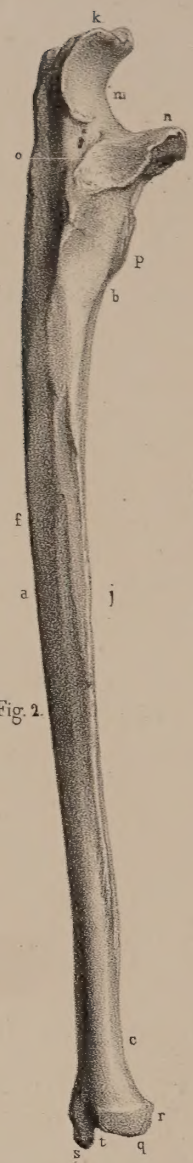

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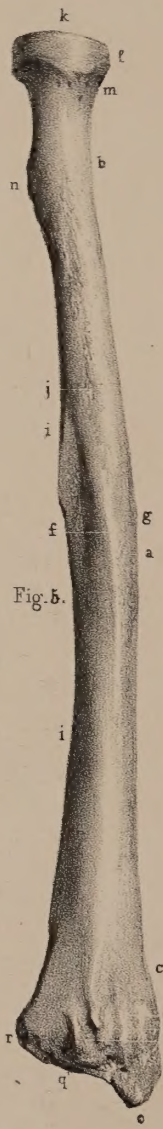

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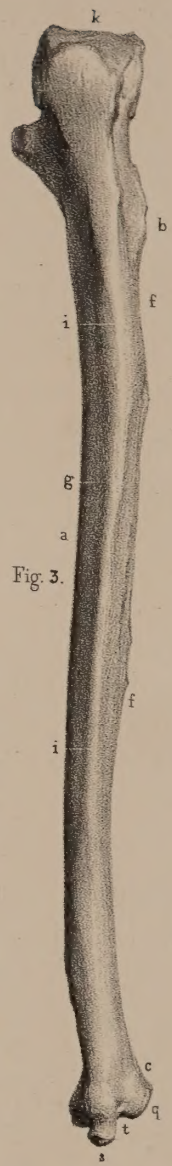

Fig. 3.

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PLATE XV.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE SUPERIOR EXTREMITY.

THE FORE-ARM.

The fore-arm is composed of two bones, the ulna and the radius.

THE ULNA.

Fig. 1, anterior view of the ulna of the right side; fig. 2, lateral view; fig. 3, external and posterior view.

Figs. 1, 2 and 3, *a*, the shaft; *b*, the upper extremity; *c*, the lower extremity; *d*, fig, 1, anterior aspect, having at *e*, the foramen for the nutrient vessels of the bone: *f f*, figs. 2 and 3, posterior aspect, divided into two unequal portions by a vertical ridge; *g*, fig. 3, internal aspect; *h—h*, fig. 1, anterior border, which is smooth and rounded; *i—i*, fig. 3, posterior border, which is prominent at its two upper thirds; *j—j*, figs. 1 and 2, external border, which about its middle is prominent and sharp.

Superior extremity of the ulna. *k*, figs. 1, 2 and 3, olecranon process; *l*, figs. 1 and 2, coronoid process; *m—n*, the greater sigmoid cavity of the ulna, divided transversely into two portions by a kind of depression: the vertical part, *m*, of the cavity, is formed by the anterior surface of the olecranon process, whilst the horizontal part, *n*, is formed by the superior surface of the coronoid: this cavity is also divided by a vertical ridge, running from the apex of the olecranon to the anterior extremity of the coronoid; *o*, fig. 2, lesser sigmoid cavity of the ulna, which articulates with the head of the radius; *p*, rough surface which gives insertion to the brachialis anticus.

Inferior extremity; *q*, figs. 1, 2 and 3, head of the ulna: it has inferiorly a smooth articulating surface for the cuneiform bone, and externally a small convex surface, *r*, figs. 1 and 2, for the inferior extremity of the radius; *s*, figs. 2 and 3, styloid process of the ulna; *t*, a groove for the passage of a tendon.

THE RADIUS.

Fig. 4, anterior view of the radius of the right side: fig. 5, posterior view.

Figs. 4 and 5, *a*, the shaft; *b*, the superior extremity; *c*, the inferior extremity; *d*. fig. 4, anterior aspect, having, *e*, the foramen for the nutrient vessels; *f*, fig. 5, posterior aspect; *g*, figs. 4 and 5, external surface; *h*, fig. 4, anterior border which is convex and rounded; *i—i*, figs. 4 and 5, internal border which is sharp and prominent; *j*, fig. 5, posterior border.

Superior extremity of the radius; *k*, figs. 4 and 5, head of the radius; *l*, margin of the head of the radius, which articulates with the lesser sigmoid cavity of the ulna; *m*, neck of the radius; *n*, bicipital tuberosity or tubercle.

Inferior extremity; *o*, figs. 4 and 5, styloid process of the radius; *p*, fig. 5, grooves at the lower end of the radius for the passage of tendons; *q*, articulating cavity which receives the scaphoid and semilunar bones; *r*, sigmoid cavity to articulate with the head of the humerus.

PLATE XVI.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE SUPERIOR EXTREMITY.

THE HAND.

The hand is divided into three parts: the carpus, the metacarpus, and the fingers.

THE CARPUS. The carpus is composed of eight bones, disposed in two rows.

FIRST ROW OF THE CARPUS. Figs 1 and 2. 1, the os scaphoides: *a*, the dorsal surface; *a'*, palmar surface; the superior surface, *b*, articulates with the radius; its inferior surface, *c*, articulates with the trapezium and trapezoides; its internal surface, *d e*, has two articulating surfaces for the os magnum and os semilunare; *f*, tubercle of the scaphoid.

Figs. 1 and 2. 2, the os semilunare: *a*, dorsal surface; *a'*, palmar surface. This bone articulates with the radius by its superior surface, *b*; with the os magnum and the os unciforme by its inferior, *c*; with the cuneiform bone by its internal, *d*; and with the os scaphoides by its external surface, *e*.

Figs. 1 and 2. 3, the cuneiform or pyramidal bone: *a*, dorsal surface; *a'*, palmar surface. It articulates by its superior surface, *b*, with the ulna; by its inferior, *c*, with the os unciforme; and by its external, *d*, with the semilunar bone; its internal surface, *e*, gives insertion to ligaments. The palmar surface has a small articulating surface, *f*, for the os pisiforme.

Figs. 1 and 2. 4, the os pisiforme. It articulates with the cuneiform bone by a small surface, *a*.

SECOND ROW OF THE CARPUS. Figs. 1 and 2. 5, the trapezium: *a*, dorsal surface; *a'*, palmar surface, having a depression bounded by an eminence, *b'*, the tubercle of the trapezium. The superior surface, *b*, articulates with the scaphoid bone. The internal aspect, *c d*, has two articulating surfaces: the inferior one, which is very narrow, articulates with the second metacarpal bone: the superior, which is broader, with the trapezium; *e*, inferior surface which articulates with the superior extremity of the first metacarpal bone; *f*, external surface.

Figs. 1 and 2. 6, the trapezoid bone: *a*, dorsal surface; *a'*, palmar surface; it articulates with the scaphoid by its superior surface; with the os magnum by its internal; with the trapezium by its external; its inferior surface is divided into two parts, *e* and *f*, by a ridge or crest, and articulates with the second metacarpal bone.

Figs. 1 and 2. 7, the os magnum: *a*, dorsal surface; *a'*, palmar surface. The superior surface, *b*, or head of the os magnum, articulates with the scaphoid and semilunar bones. The inferior surface, *c*, has three articulating surfaces; the first for the second metacarpal; the second, which is the largest, for the third metacarpal; and the third, which is very small, for the fourth metacarpal bone. The internal surface, *d*, has an articulating surface for the unciform bone; the inferior surface, *e*, articulates with the trapezoid.

Figs. 1 and 2. 8, the os unciforme: *a*, dorsal aspect; *a'*, palmar aspect, having a hooked-like process, *f*; *b*, superior aspect which articulates with the semilunar bone; *c*, inferior aspect, which articulates with the fourth and fifth metacarpal bones; *d*, internal aspect, which articulates with the cuneiform bone; *e*, external aspect, which articulates with the os magnum.

THE METACARPUS. Figs. 1 and 2. 9—13, the five bones of the metacarpus. Fig. 1, *a*, dorsal aspect; fig. 2, *a*, palmar aspect; *b*, superior extremity. It has three articular surfaces: the middle one, *b*, articulates with a corresponding surface in one of the carpal bones: the lateral ones, *d d'*, articulate with the adjacent metacarpal bones. In some of these bones, which are, as it were, impacted between the bones of the carpus, these articulating surfaces are double on one or both sides. The first metacarpal bone, 9, has no lateral articulating surfaces; its superior extremity which articulates with the trapezium is concave from before backwards, and convex transversely. The fifth, 13, has but the external lateral articulating surface; *c*, inferior extremity: it has a head or condyle, *c'*, which is more prolonged on the palmar than on the dorsal aspect, to admit of flexion; and at each side an eminence, *e f*, between which and the head there is a depression.

THE FINGERS. Figs. 1 and 2. 14—18, The first phalanges of the fingers. Fig. 1, *a*, dorsal aspect which is convex; fig. 2, *a*, palmar aspect which is concave; the superior extremity, *b*, has a glenoid cavity which receives the head of the corresponding metatarsal bone; the inferior extremity, *c*,' has a pulley-like articulating surface.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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Figs. 1 and 2, 19—22, Second phalanges. The thumb has no second phalanx. Fig. 1, dorsal aspect; fig. 2, palmar aspect; *a*, superior extremity, which articulates with the first phalanx; *b*, inferior extremity, which articulates with the third phalanx.

Figs. 1 and 2. 23—27, Third phalanges; *c*, superior extremity, which articulates with the second phalanx; *d*, inferior extremity.

Fig. 3, Inferior articular surfaces of the radius and ulna; *a*, inferior extremity of the radius, having an articular surface, *b c*, divided into two portions by a ridge; the external part of this surface, *b*, articulates with the scaphoid bone, and the internal, *c*, with the os semilunare; *d*, styloid process of the radius; *e*, lesser head of the ulna; its surface is a plane, which articulates with the pyramidal bone; *f*, styloid process of the ulna.

Fig. 4. Superior articular surfaces of the bones of the first row; *a*, the scaphoid; *b*, its articular surface; *c*, the os semilunare; *d*, the os pyramidale; *e*, the os pisiforme; *f*, the trapezium; *g*, the ossa trapezoides and magnum; *h*, process of the os unciforme; *j*, tubercle of the trapezium. These surfaces form by their union a convex articular surface which fits the corresponding concave surface formed by the radius and ulna. (See fig. 3.)

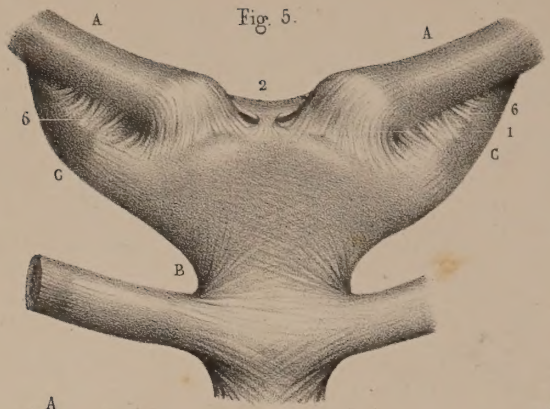
Fig. 5. Inferior articular surfaces of the bones of the first row: *a*, tubercle of the scaphoid; *b*, its articular surface; *c*, os semilunare; *d*, its articular surface; *e*, the os pyramidale; *f*, its articular surface; *g*, the os pisiforme.

Fig. 6. Superior articular surface of the bones of the second row; *a*, the trapezium; *b*, its tubercle; *c*, its articular surface; *d*, the os trapezoides; *e*, its articular surface; *f*, the os magnum; *g*, its head; *i*, articular surface of the os unciforme; *j*, its process. By the union of these bones a convex and a concave surface are formed. The convex surface is formed by the os magnum and the os unciforme, and articulates with a cavity formed by the inferior surfaces of the bones of the first row. The concave surface is formed by the trapezium and trapezoid bones, and articulates with the os scaphoides.

Fig. 7. Inferior articular surfaces of the bones of the second row: they articulate with the five metacarpal bones: *a*, the trapezium: *b*, its articular surface; *c*, the os trapezoides; *d*, the os magnum; *e*, the os unciforme; *f*, its hook-like process.

Pl.17.

Fig. 5.



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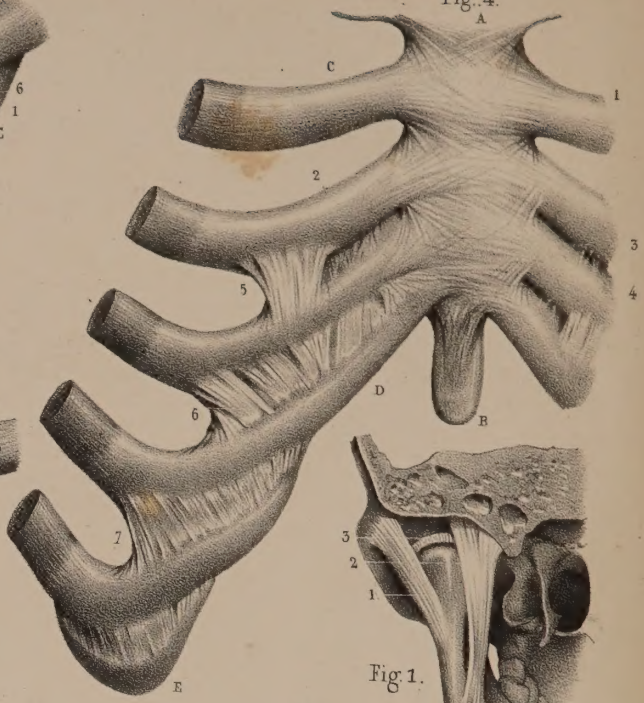

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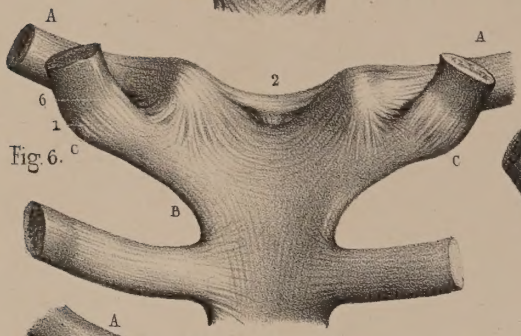


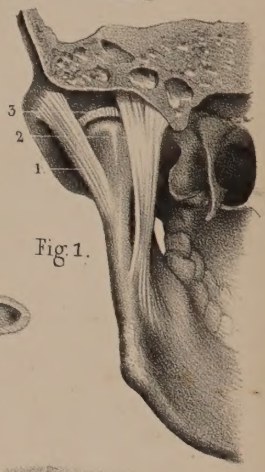


Fig. 1.

Fig. 7.

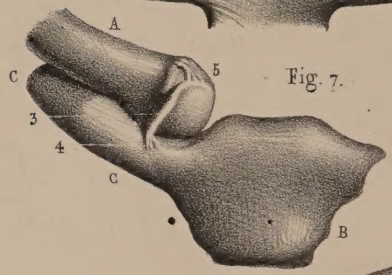


Fig. 3.

Fig. 9.

Fig. 2.

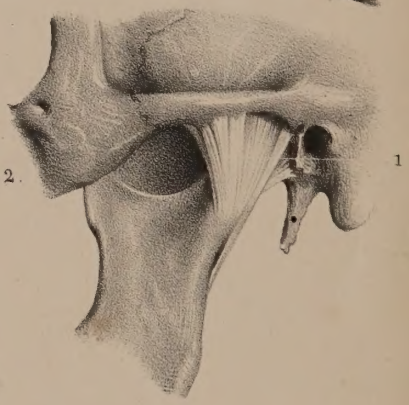
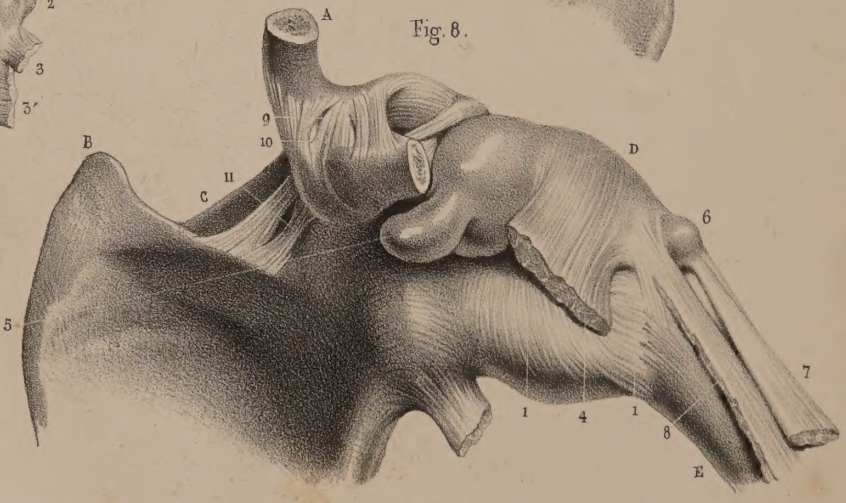


Fig. 8.



Emile Beau ad naturam del.

Offic. litho Artus

PLATE XVII.

APPARATUS OF LOCOMOTION—THE LIGAMENTS.

Figs. 1, 2, 3, Temporo-Maxillary Articulation. 1, external lateral ligament, which extends from the external aspect of the articular condyle of the lower jaw to the tubercle that lies at the point of junction of the two roots of the zygomatic arch; 2, internal lateral ligament, constituted by a very slender band of aponeurotic membrane, and extending from the spine of the os sphenoides to the kind of unciform process which lies to the inside of the inferior dental canal; 3, inter-articular cartilage; its inferior aspect is moulded upon the head of the maxillary condyle, and is concave; its superior aspect is alternately convex and concave, to accord first with the glenoid cavity, and next with the transverse root of the zygomatic arch.

Fig. 4, Chondro-Sternal Articulations. *A*, sternum; *B*, xiphoid cartilage; *C*, *D*, *E*, costal cartilages.

The cartilages of the first seven ribs are connected to the sternum by two ligaments, one anterior, the other posterior. The anterior costo-sternal ligament, which is also called the ligamentum radiatum anterius, 1—2—3, decussates on the mesial line with that of the opposite side, blending at the same time with the origins of the pectoralis major muscle. The ligamentum radiatum posticum is extremely thin; 4, ligamentum xiphoideum, which extends obliquely from the cartilage of the seventh rib to the anterior aspect of the xiphoid cartilage, where it interlaces with that of the opposite side; 5—6—7, fibrous slips which connect the cartilages of the fifth, sixth, seventh, and eighth ribs.

Figs. 5, 6, and 7, sterno-clavicular articulation; *A*, internal end of the clavicle; *B*, first piece of the sternum; *C*, cartilage of the first rib.

1, capsular ligament, extending from the margin of the articular surface of the clavicle to the corresponding one of the sternum; 2, inter-articular ligament connecting the proximal extremities of the two clavicles. It is attached to the furca of the sternum by a few fibres; 3, interarticular cartilage; it adheres intimately to the capsular ligament, 4, to the cartilage of the first rib, 5, and to the clavicle; 6, costo-clavicular ligament; it extends from the internal aspect of the first costal cartilage to a rough surface situated on the inferior aspect of the clavicle near its inner extremity.

Figs. 8 and 9, scapulo-humeral articulation; shoulder joint. Fig. 8, *A*, external extremity of the clavicle; *B*, superior angle of the scapula; *C*, spine of the scapula; *D*, coracoid process, the extremity of which has been removed; *E*, superior extremity of the humerus. Fig. 9, *A*, inner or proximal extremity of the clavicle; *B*, external extremity of the clavicle; *C*, acromion; *D*, humerus.

Figs. 8 and 9. 1—1, capsulo-ligament, extending from the edge of the glenoid cavity of the scapula to the anatomical neck of the humerus; 2, ligamentum accessorium of the capsular ligament, a coracoid slip, which, proceeding from the anterior margin of the coracoid process, expands upon the capsular ligament; 3—3, tendons of the infra spinatus and teres minor muscles; 4, tendon of the subscapularis. The capsular ligament always presents an opening at the level of the tendon of the subscapularis, which transmits a process or prolongation of the synovial membrane, 5, which can be very readily demonstrated by inflating the joint. Opposite the bicipital groove, the fibrous capsule forms a kind of bridge, under which passes that process of the synovial membrane, 6, which surrounds the tendon of the long portion of the biceps, 7; 8, tendon of the pectoralis major; 9—10 (fig. 8), ligaments which connect the external extremity of the clavicle with the coracoid process. They are two in number; one anterior, 9, named the trapezoidal ligament; the other posterior, 10, called the conoidal or radiated ligament; 11, the ligament which converts the coracoid notch into a hole; 12 (fig. 9), ligament which unites the outer extremity of the clavicle with the acromion; 13—14, coraco-acromial ligament, extending from the apex of the whole of the posterior margin of the coracoid process.

PLATE XVIII.

Figs. 1, 2, 3, elbow-joint, fig. 1; *A*, humerus; *B*, *D*, ulna; *C*, *E*, radius.

Fig. 1, 1, internal lateral ligament; partly united with the tendon of the flexor sublimis digitorum, 2, it extends from the internal tuberosity of the humerus to the inner aspect of the coronoid process of the ulna; 3, fibrous slip which extends from the coronoid process to the olecranon; 4, posterior ligament; 5, anterior ligament; 6, interosseous ligament; 7, foramen, for transmitting vessels; 8, ligament of Weitbrecht; 9, tendon of the biceps muscle.

Fig. 2, *A*, extremity of the humerus; *B*, of the ulna; *C*, of the radius.

1, external lateral ligament which blends with the tendons, 2—3, of the extensors of the fingers, and short supinator, 4; it arises from the top of the external tuberosity of the humerus, whence its fibres proceed in radii to terminate, some upon the annular ligament of the radius, others 5 upon the external edge of the olecranon.

Fig. 3, *A*, lower end of the humerus; *B*, of the ulna; *C*, of the radius.

1—2—2, anterior ligament; 4, annular ligament of the radius, inserted by its two extremities in front of and behind the sigmoid cavity of the ulna; it is intimately connected with the anterior ligament, and with the tendons of the short supinator, 5, and common extensor of the fingers; 6—7—8, tendons of the pronator teres, and flexor of the fingers; 9, ligamentous band of Weitbrecht; 10, tendon of the biceps brachialis.

Fig. 4, Radio-ulnar articulation, *A*, *B*, inferior articular surface of the radius; *C*, *D*, small head of the ulna; *E*, styloid process of the ulna.

1, triangular ligament, attached by its base to the inferior edge of the small sigmoid cavity of the radius, and by its summit to the entering angle which the little head of the ulna forms with the styloid process; 5—6—7—8—9, articulation of the hand—wrist joint.

Fig. 5 (Palmar aspect), *A*, lower end of the radius; *B*, lower end of the ulna; *C*, *D*, *E*, metacarpal bones; *F*, *G*, first phalanges of the fingers.

1, interosseous ligament; 2—2—3, anterior radio-carpal ligament. It proceeds from the anterior edge of the lower end of the radius, to be inserted into the os scaphoides, os unciforme, os magnum, and os pyramidale; 4, anterior ulno-carpal ligament. It proceeds from the groove between the styloid process and small head of the ulna, to be implanted into the os pyramidale and os pisiforme; its superior fibres, nearly horizontal, 5, arise from the inferior edge of the radius, interlacing with the fibres of the radio-carpal ligament; 6—7, ligaments which connect the os magnum with the scaphoides, pyramidale, trapezium, and os unciforme; 8—9, inferior ligaments of the os pisiforme; 10, ligament extending from the trapezium to the trapezoides; 11, ligaments connecting the carpal bones of the second rank with the superior extremities of the metacarpal bones; 12, fibrous capsule, connecting the trapezium with the 1st metacarpal bone; 13—13, ligaments connecting the carpal extremities of the metacarpal bones with each other. They consist of two oblique slips extending from one metacarpal bone to another; 14—14, transverse palmar ligament; 15, sheaths of the tendons of the flexor muscles,—anterior ligaments of the metacarpo--phalangeal articulations.

Fig. 6 (Dorsal aspect), *A*, lower end of the ulna; *B*, lower end of the radius; *C*, *D*, *E*, bones of the first rank of the carpus; *F*, bones of the second rank; *G*, *H*, the metacarpus.

1, interosseous ligament; 2—2, posterior ligament of the radio-carpal articulation. It is very slender, and is closely connected with the fibrous sheaths, 3—4—5—6, of the extensor muscles; 7, internal lateral ligament; 8—8, dorsal ligament, connecting the two ranks of the carpal bones; 9, ligament extending from the scaphoides to the trapezium; 10, ligament uniting the os pyramidale with the os unciforme; 11—12—13, ligaments connecting the bones of the second rank; 14, ligaments connecting the bones of the carpus with the second metacarpal bone; 15, ligaments extending between the os magnum and the metacarpal bone; 16, ligaments extending from the os magnum and os unciforme to the fourth metacarpal bone; 18, fibrous capsule which connects the trapezium with the 1st bone of the metacarpus; 19—19, ligaments uniting the superior extremities of the metacarpal bones.

Fig. 7 (Ulnar edge), *A*, lower end of the radius; *B*, lower end of the ulna; *C*, *D*, metacarpal bones; *E*, os pisiforme; *F*, os unciforme.

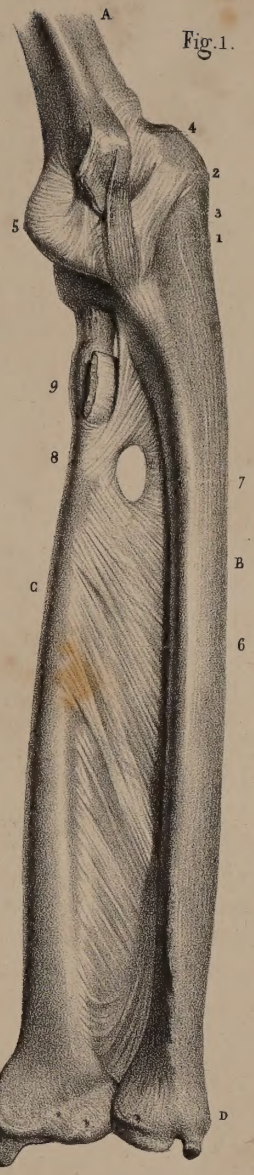
1, internal lateral ligament of the wrist-joint; it extends from the base of the styloid process of the ulna to the pisiforme bone and posterior aspect of the pyramidal bone; the depression, or vacancy in its middle, 3, communicates with the wrist-joint.

Fig. 8, *A*, *B*, *C*, bones of the first rank of the carpus; *D*, *E*, *F*, *G*, bones of the second rank; *H*, *H*, bones of the metacarpus.

1—2, interosseous ligaments of the 1st rank of bones; 3—4, interosseous ligaments of the 2nd rank; 5, interosseous ligament from the os magnum to the 3rd metacarpal bone; 6, interosseous ligament from the trapezium to the second metacarpal bone; 7—8—9, interosseous ligaments connecting the superior extremities of the metacarpal bones.

Fig. 9, 1—2—3, external lateral ligaments, connecting the 1st phalanges with the bones of the metacarpus, the 1st phalanges with the 2nd, and the 2nd with the 3rd. The internal lateral ligaments are less developed than the external lateral ligaments. A similar disposition is remarked in the foot.

Fig.1.



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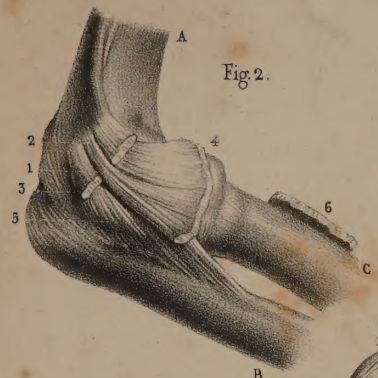
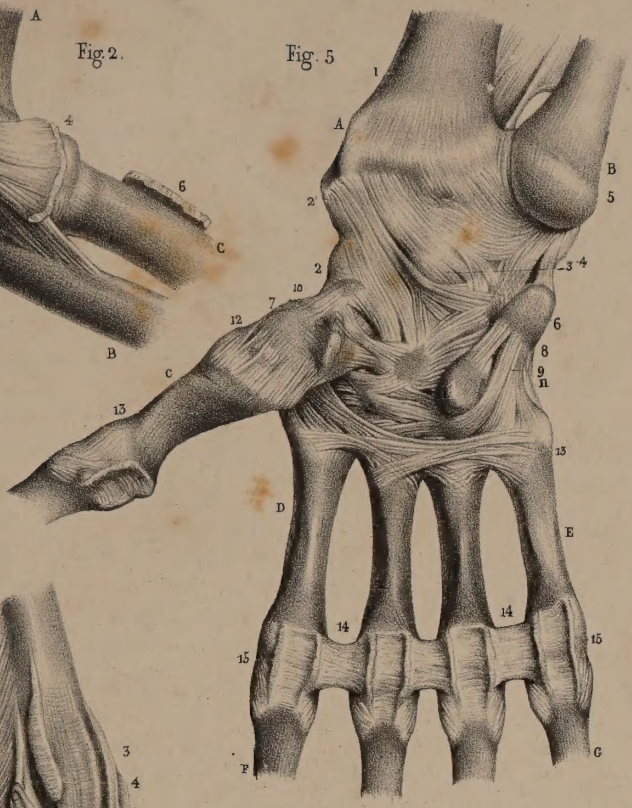


Fig. 5



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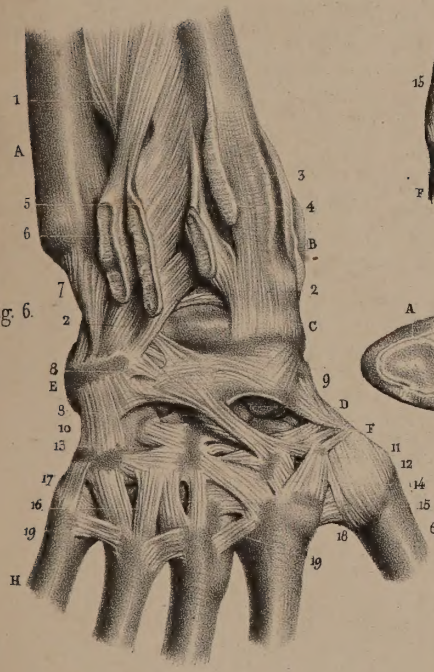

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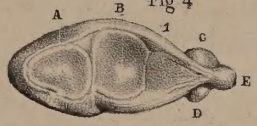

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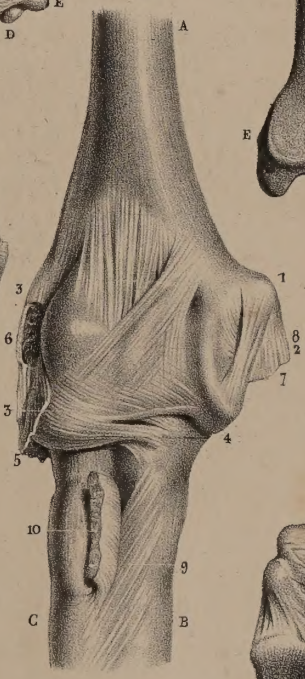

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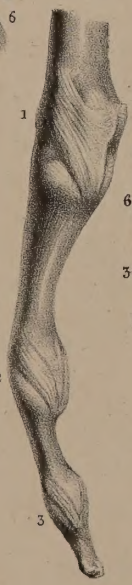

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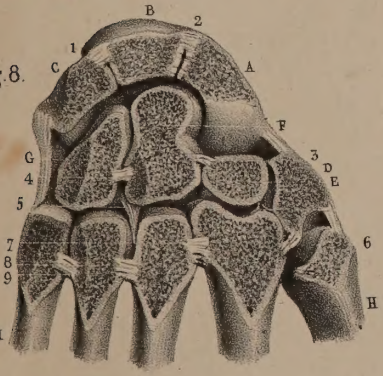

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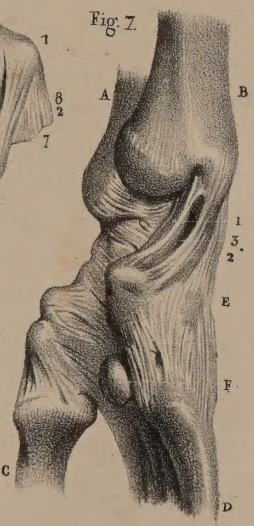

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Offic litho Artus.

Pl. 19.

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PLATE XIX.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE INFERIOR EXTREMITY.

THE INFERIOR EXTREMITY IS COMPOSED OF FOUR PARTS, VIZ: THE HIP, THE THIGH, THE LEG, THE FOOT.

THE HIP.

The hip is composed in the adult of one bone, the os innominatum.

THE OS INNOMINATUM.

Figs. 1 and 2. External aspect of the right os innominatum. It is inclined downwards and outwards at its superior portion, and forwards and downwards inferiorly.

Fig. 1. Superior portion of the femoral aspect; its surface is alternately concave and convex, and is called the external iliac fossa or dorsum; it is marked by two elevated curved lines; the posterior one, *a*, is entitled the superior curved line; the anterior one, *a' a'*, is of greater extent, and is named the inferior curved line. The space between these lines is concave: the space between the inferior curved line and the edge of the acetabulum, *b*, is concave from above downwards, and convex from before backwards; *c*, attachments of muscles; *d*, foramen for the passage of the nutrient artery.

Fig. 2. Inferior portion of the external aspect; *b*, the cotyloid cavity, or acetabulum; *b'*, depression at the posterior part of the acetabulum; *e e*, the margin, or supercilium acetabuli; *e'*, the cotyloid notch or incisura acetabuli; *f—f'*, transverse grooves above and below the acetabulum; *g*, thyroid or obturator foramen, which is oval in the male and triangular in the female; *h—h*, *h'—h'*, circumference of the thyroid foramen.

Fig. 3. Internal aspect of the os innominatum; *g'*, thyroid notch, which is continuous with the thyroid foramen, *g*, *h*, *h'*; *i*, the ilio-pectineal line, which forms part of the brim of the pelvis; *k*, internal iliac fossa or venter; *l'*, foramen for the nutrient artery; *m*, auricular surface, where it articulates with the sacrum and forms the sacro-iliac synchondrosis; *n*, convex and rough surface, named the tuberosity of the crista ilii.

Figs. 1, 2, 3. *l*, *l'*, the superior border of the os innominatum, in shape like an italic *S*, it is called the crista ilii, it has an external and internal edge or lip and an intervening rough surface; *m'*, *m'*, figs. 2 and 3, the internal lip; *n'*, *n'*, figs. 1 and 2, the external lip; *o*, *o*, figs. 1 and 2, the intervening surface.

Figs. 2 and 3. *p*, *p*,' *p*," the inferior border, divided into two parts, the anterior one *p p*,' is vertical and has a rough elliptical surface, which, with its fellow of the opposite side, forms the symphysis pubis: the posterior part, *p' p*," is inclined outwards and assists to form the arch of the pubis.

Figs. 2 and 3, *q—v*, the anterior border; *q*, figs. 1, 2, 3, the anterior superior spinous process of the ilium; *q'*, superior depression; *r*, anterior inferior spinous process; figs. 2 and 3, *r'*, inferior depression; *s*, ilio-pectineal eminence; *s'*, the pectineal surface, its anterior border, *t*, is continuous with the thyroid notch: and its posterior border, called the crest of the pubis; *t'*, figs. 2 and 3, is continuous with the ilio-pectineal line; *u*, fig. 2, the spine of the pubis; *v*, figs. 2 and 3, angle of the pubis.

Figs. 1, 2, 3; *x—z'*, the posterior border; *x*, the posterior superior spinous process of the ilium; *x*,' fig. 1, and 3, the posterior inferior spinous process; *y*, the greater sacro-sciatic notch; *y'*, the spine of the ischium; *z*, the lesser sacro-sciatic notch; *z'*, figs 1, 2, 3, the tuberosity of the ischium.

PLATE XX.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE INFERIOR EXTREMITY.

THE THIGH.

The thigh is composed of but one bone, the femur.

THE FEMUR.

Fig. 1. Anterior aspect of the right femur; fig. 2, posterior aspect; fig. 3, inferior aspect of the lower extremity (¾ natural size.)

Figs. 1 and 2, *a*, the body of the femur; *b*, the superior extremity; *c*, the inferior extremity; fig. 1, *d*—*d*, the anterior surface of the femur; fig. 2, *e*—*e*, the internal surface; *f*—*f*, the external surface; *e'*, foramen for the nutrient artery; *g*—*g*, figs. 1 and 2, the lateral borders, they are thick and rounded, and are with difficulty distinguished from the internal and external surfaces; *h*, fig. 2. the posterior border; it is broad and rough, and is called the linea aspera, it has an internal margin, *h''*, an external, *h'*, and an intervening space, *h*: the linea aspera is bifurcated at its superior and inferior extremities; *i*, internal branch of the superior bifurcation; *i'*—*i'*, external branch, it has a rough eminence, *k*, for the insertion of the gluteus maximus. The internal branch of the inferior bifurcation, *l*, terminates at the eminence, *m*, above the internal condyle, and is not so strongly marked as the external branch, *l'*, which terminates at the eminence, *m'*; these branches enclose between them a triangular space that corresponds with the popliteal vessels.

Figs. 1 and 2, *o*, the head of the femur, having at its summit a depression *o'*, which gives insertion to the ligamentum teres; *p*, the neck of the femur, it is united to the body of the bone at an angle more or less obtuse; it is very obtuse in the male, but nearly at right angles in the female; *q*, the superior border of the neck, it is longer posteriorly than it is in front; *q'*, the inferior border, it is longer than the superior one; *r*, the great trochanter, at this eminence the external branch of the superior bifurcation of the linea aspera terminates, fig. 2; *r'*, fig. 2, the digital or trochanteric fossa; *s*, the trochanter minor; this eminence, fig. 2, is continuous with the internal branch of the superior bifurcation of the linea aspera; *s'*—*s'*, fig. 1, prominent line, which unites the two trochanters on the anterior aspect of the femur; *t*—*t'*, fig. 2, thick and prominent ridge uniting these eminences posteriorly.

Figs. 1, 2, 3, *u*, *u*, the external condyle of the femur; *u'*, *u'*, the internal condyle: the internal condyle is not so thick as the external, but is rather longer and projects more posteriorly. The condyles are separated posteriorly by a deep fossa, *v*, figs. 2 and 3, called the intercondyloid fossa; *x*, fig. 3, internal surface of the external condyle; *x'*, external surface of the internal condyle: these two surfaces are deeply excavated, to give insertion to ligaments. The two condyles are united in front to form a kind of pulley-like surface, *y*, figs. 1 and 3, called the trochlea of the femur. That part of the trochlea formed by the internal condyle is not so broad, nor does it project so much as that formed by the external condyle; *z*, the external tuberosity of the femur; *z'*, the internal tuberosity.

THE PATELLA.

Fig. 5. Anterior aspect of the right patella; *a*—*b*, the base; *c*, the apex or summit.

Fig. 6. Posterior aspect of the patella; *a*—*b*, the base; *c*, the apex; *d*, vertical ridge, that separates the two articular surfaces; the internal articular surface, *e*, is smaller and less deep than the external, *f*. These two surfaces articulate with the anterior surfaces of the condyles of the femur.

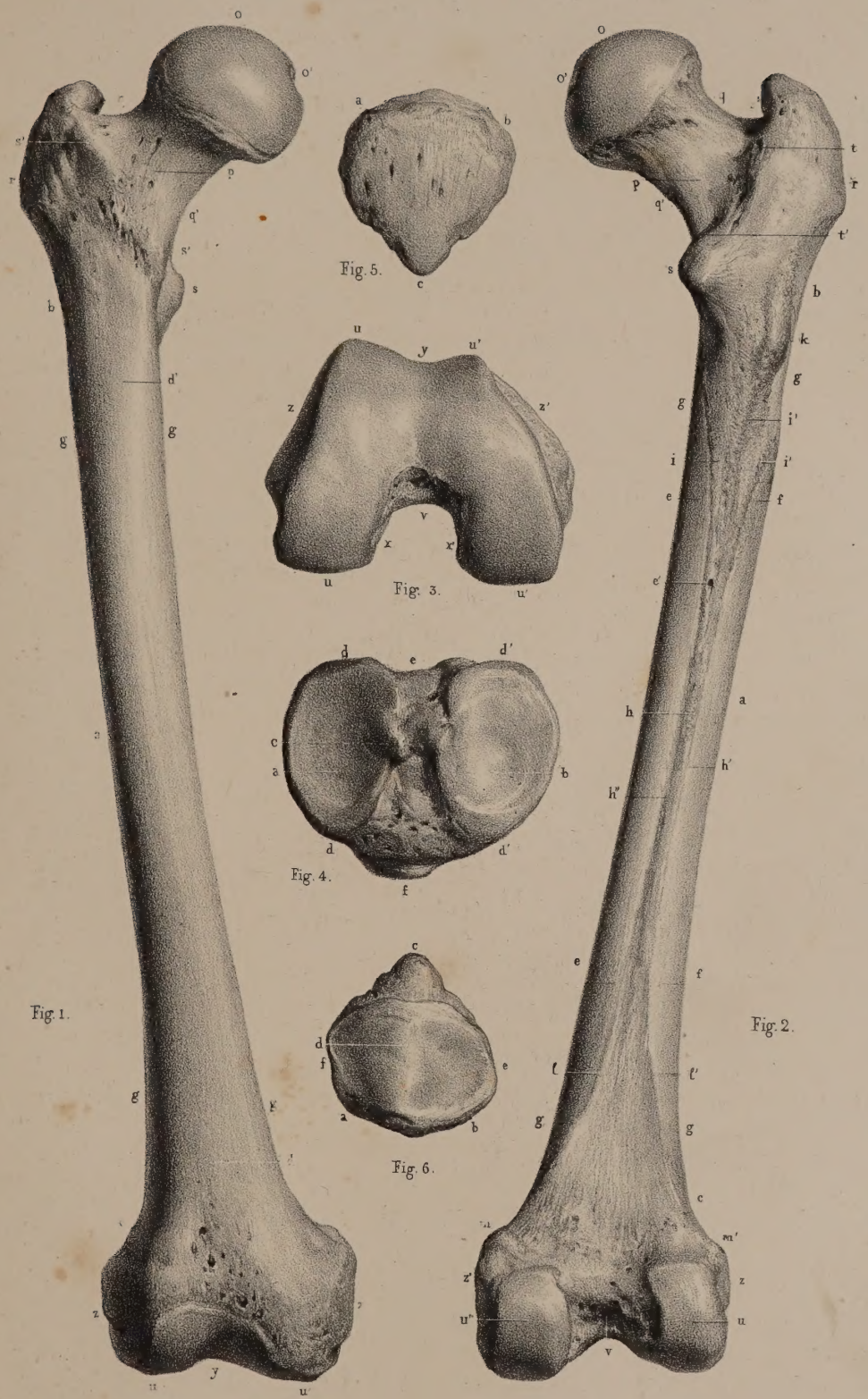

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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Pl. 21.

Émile Beau ad naturam del.

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PLATE XXI.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE INFERIOR EXTREMITY.

THE LEG.

The Leg is composed of two bones, the Tibia and Fibula.

THE TIBIA.

Fig. 1. Anterior view of the tibia of the right side. Fig. 2, posterior view of the same.

Figs. 1 and 2. *a*, the shaft; *b*, the upper extremity; *c*, the lower extremity; *d*—*d*, fig. 1, internal aspect; *e*—*e*, external aspect, which is inclined forwards at its lower part. Fig. 2, *f*, posterior aspect, having at its upper part a rough line running obliquely downwards and inwards. Below this line is, *h*, the foramen for the nutrient artery of the bone; *i*—*i*, fig. 1, anterior border: this border, which is smooth and rounded at its lower third, is sharp and prominent at the two upper thirds, and is called the crest of the tibia; *j*—*j*, fig. 2, internal border; *k*—*k*, external border, giving insertion to the interosseous ligament.

Superior extremity of the tibia. Figs. 1 and 2; *l l'*, tuberosities of the tibia; *m m'*, condyles of the tibia, separated from each other by an eminence, *n*, called the spine of the tibia; the internal tuberosity, *l'*, is larger than the external, and has a groove, *o*, fig. 2, at its posterior part for the lodgement of a tendon. The external tuberosity, *l*, has, at its posterior part, a flat surface, *p*, which articulates with the head of the fibula; *q*, fossa separating the two condyles; *r*, anterior tuberosity, or tubercle, of the tibia.

Inferior extremity. Figs. 1 and 2; *s*, malleolus internus; its posterior surface is marked with a groove, *t*, fig. 2, for the passage of two tendons; its internal surface forms part of the articulating surface of the tibia, *v*, (see pl. 22, fig. 3); *u*, fig. 2, a triangular concave surface, which superiorly is rough, and gives insertion to a ligament, and inferiorly is smooth for its articulation with the fibula.

THE FIBULA.

Fig. 3. Anterior view of the right fibula; fig. 4, posterior view.

Figs. 3 and 4. *a*, the body; *b*, the superior extremity; *c*, inferior extremity; *d d*, fig. 3, external aspect; superiorly it is inclined a little forwards, inferiorly it is inclined backwards; *e*, fig. 4, internal aspect, divided into two unequal halves by a vertical ridge which gives insertion to the interosseous ligament: this surface is inclined forwards at its inferior part, *e'*, fig. 3; *f*—*f*, fig. 4, posterior aspect; this surface, which at its upper part is turned a little outwards, is inclined inwards inferiorly: it terminates in a rough surface, *g*; *h*, orifice for the nutrient vessels of the bone; *i*—*i*, fig. 3, external border, which becomes posterior inferiorly, *i'*—*i'*, fig. 4; *j*—*j*, fig. 4, internal border, prominent and sharp about the middle; it becomes a little anterior at its inferior part, *j'*—*j'*, fig. 3; *k*—*k*, fig. 4, anterior border, which is turned outwards, *k'*, fig. 3, and is bifurcated, inferiorly.

The superior extremity or head of the fibula presents at its internal aspect a surface, *l*, figs. 3 and 4, which articulates with a corresponding surface of the tibia: externally it has a process, *m*, the styloid process of the fibula.

The inferior extremity, or malleolus externus, has, at its inferior part, a surface, *n*, figs. 3 and 4, which articulates with the astragalus; *o*, depression which gives insertion to a ligament; *p*, apex of the malleolus; *q*, groove for the passage of two tendons.

PLATE XXII.

APPARATUS OF LOCOMOTION.—THE OSSEOUS SYSTEM.

THE INFERIOR EXTREMITY.

THE FOOT.

The Foot is divided into three parts, viz. the Tarsus, the Metatarsus, and the Toes.

THE TARSUS.

The tarsus is composed of seven bones, which are arranged in two rows.

First row of the Tarsus. Fig. 1. 1, the astragalus. Its superior surface, *a*, is pulley-like, and articulates with the inferior extremity of the tibia; it is continuous with the internal and external surfaces, *a* and *b*, which articulate with the malleoli; *d*, neck or cervix of the astragalus; *e*, head of the astragalus: it presents an articulating surface, *f*, which corresponds with the posterior surface of the scaphoid bone; *g*, groove for the passage of a tendon; fig. 2. 4, the astragalus: its inferior aspect has two articular surfaces, *a* and *b*, separated by a transverse depression, *c*; *d*, anterior or scaphoid surface; *e*, groove for a tendon; *f*, internal surface; *g*, external surface. —Fig. 1. 2, the calcaneum or os calcis; its superior surface has two articulating surfaces, *a* and *b*, corresponding to those on the inferior surface of the astragalus, and separated by a depression, *c*; the anterior surface, *e*, is bounded on one side by an eminence, *d*, which is called the processus minor of the calcaneum, and on the other by an eminence, *f*, which is called the processus major; *g*, external surface; *h*, internal surface; *i*, posterior surface. Fig. 2. 2, the calcaneum; *a*, inferior surface; *b*, tubercle; c, anterior or cuboid surface; *d*, inferior aspect of the processus minor; *e*, internal surface; *f*, external surface which has two grooves, *g*.

Second row of the Tarsus. Fig. 1. 3, the cuboideum or os cuboides; *a*, superior surface; *b*, posterior or calcaneal surface; *c*, tubercle of the cuboideum; *d*, anterior surface which articulates with the fourth and fifth metatarsal bones; *e*, internal surface which articulates with the external cuneiform bone, and sometimes with the scaphoid; *f*, external border. Fig. 2. 3, the cuboideum; *a*, inferior surface: it has a groove, *b*, bounded posteriorly by a ridge, *c*; *d*, posterior surface; *e*, anterior surface; *f*, internal surface; *g*, tubercle.—Fig. 1. 4, the os scaphoides: *a*, superior surface; *b*, posterior surface, concave for the reception of the head of the astragalus; *c*, *d*, *e*, anterior surface, having three articulating surfaces for the three cuneiform bones; *f*, tubercle of the scaphoid; *g*, external border. Fig. 2. 4, the os-scaphoides; *a*, inferior surface; *b*, tubercle; *c*, posterior surface, articulating with the astragalus; *d*, anterior surface; *e*, articulating surface for the os-cuboides.—Fig. 1. 5, the first or internal cuneiform bone; *a*, superior surface; *b*, external surface, having at the posterior part an articulating surface for the middle cuneiform bone, and one anteriorly for the second metatarsal bone; *c*, internal surface; *d*, posterior surface, which articulates with the os scaphoides; *e*, anterior surface which articulates with the first metatarsal bone. Fig. 2. 5, the internal cuneiform bone; *a*, inferior surface which is rough; *b*, posterior surface; *c*, anterior surface; *d*, external surface; *e*, internal surface. Fig. 1. 6, the second or middle cuneiform bone; *a*, superior surface or base; *b*, external surface which articulates with the external cuneiform bone; *c*, internal surface, which articulates with the internal cuneiform bone; *d*, posterior surface which articulates with the scaphoid bone; *e*, anterior surface, articulating with the second metatarsal bone. Fig. 2. 6, the middle cuneiform bone; *a*, inferior surface or apex; *b*, posterior surface; *c*, anterior surface; *d*, external surface; *e*, internal surface.—Fig. 1. 7, the third or external cuneiform bone; *a*, superior surface or base; *b*, external surface which articulates with the cuboid bone; *c*, internal surface, which at its anterior part articulates with the second metatarsal, and posteriorly with the middle cuneiform, bones; *d*, posterior surface, which articulates with the scaphoid bone; *e*, anterior surface which articulates with the third metatarsal bone. Fig. 2. 7, the external cuneiform bone; *a*, inferior surface or apex; *b*, posterior surface; *c*, anterior surface; *d*, external surface; *e*, internal surface.

THE METATARSUS.

Fig. 1 and 2. 8—12, the five metatarsal bones. Fig. 1, *a*, superior surface. Fig. 2, *a*, inferior surface; *b*, posterior extremity, having three articulating surfaces: the middle one, b', articulates with a corresponding surface on one of the tarsal bones: the two lateral ones, *d* and *e*, cor-

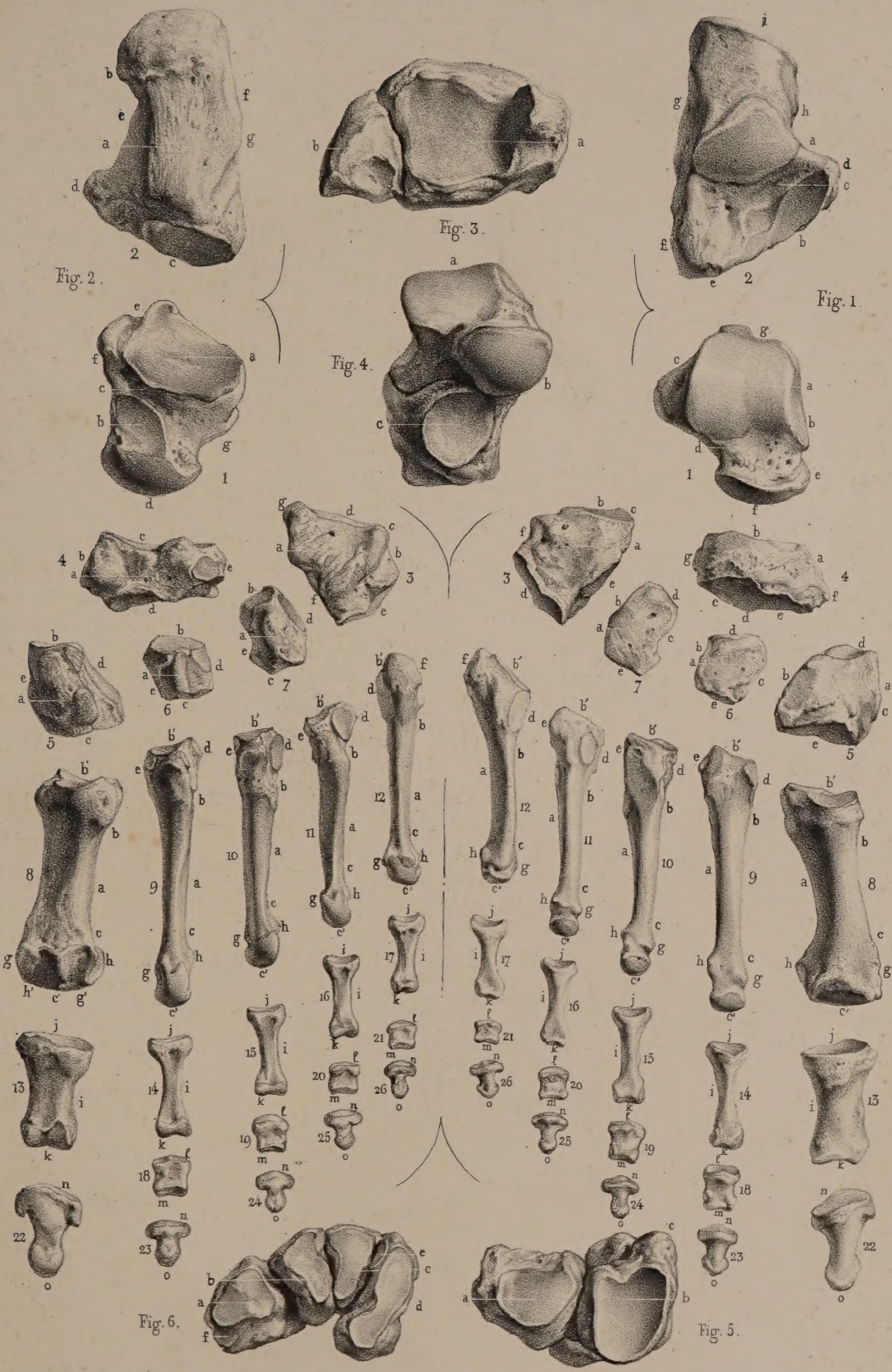

Fig. 2.

Fig. 3.

Fig. 1.

Fig. 4.

Fig. 6.

Fig. 5.

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respond to those of the adjacent metatarsal bones. In some of these bones, which are, as it were, impacted between the bones of the tarsus, these articulating surfaces are double on one or both sides. The first metatarsal bone, which is the largest of all, has no lateral articulating surfaces: the fifth has only the internal one, the external being replaced by a process, *f*. The anterior extremity, *c*, has a head or condyle, *c'*, which articulates with the first phalanx of the toes: at the sides there are two little eminences, *h* and *g*, separated from the head by a depression. The anterior extremity of the first metatarsal bone has at its inferior part two grooves, *h'* and *g'*, separated by a ridge.

THE TOES.

Figs. 1 and 2. 13—17. First phalanges of the toes. Fig. 1, *i*, superior surface. Fig. 2. *i*, inferior surface: *j*, posterior extremity: *k*, anterior extremity; 18—21, second phalanges; *l*, posterior extremity; *m*, anterior extremity: the great toe has no middle phalanx: 22—26, third phalanges; *n*, posterior extremity; *o*, anterior extremity.

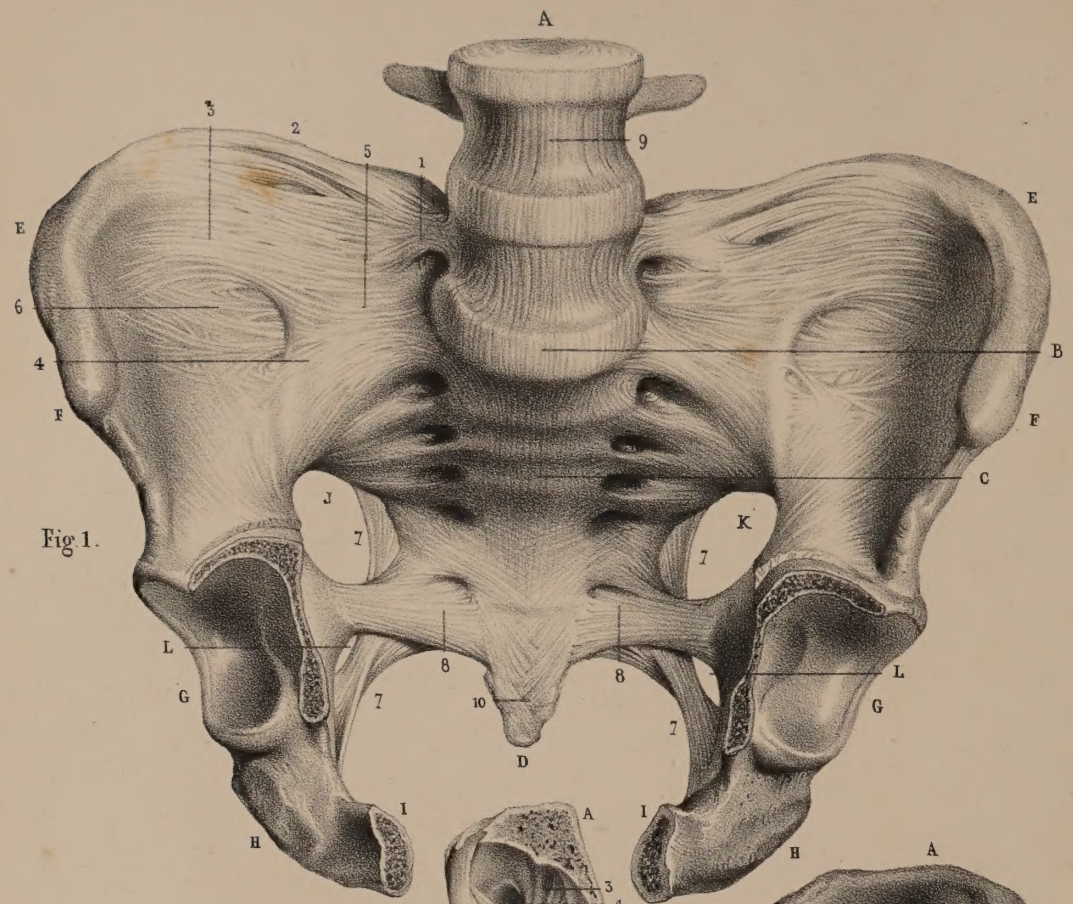
Fig. 3. *a*, articular cavity at the inferior extremity of the tibia, crossed by a ridge which runs from before backwards; *b*, inferior extremity of the fibula which completes the articular cavity formed by the tibia.

Fig. 4. Anterior articular surfaces of the bones of the first row of the tarsus; *a*, superior surface of the astragalus which articulates with the inferior extremity of the tibia; *b*, head of the astragalus which articulates with the os scaphoides; *c*, anterior surface of the calcaneum which articulates with the os cuboides.

Fig. 5. Posterior articular surfaces of the bones of the second row; *a*, surface of the cuboid bone which articulates with the anterior surface of the calcaneum; *b*, glenoid cavity of the scaphoid, which receives the head of the astragalus; *c*, tubercle of the scaphoid.

Fig. 6. Anterior articulating surfaces of the bones of the second row; *a*, anterior articulating surface of the cuboid bone; *b*, of the external cuneiform; *c*, of the middle cuneiform; *d*, of the internal cuneiform; *e*, surface of the internal cuneiform, which articulates with the second metatarsal bone; *f*, inferior surface of the os cuboides.

Pl. 23.



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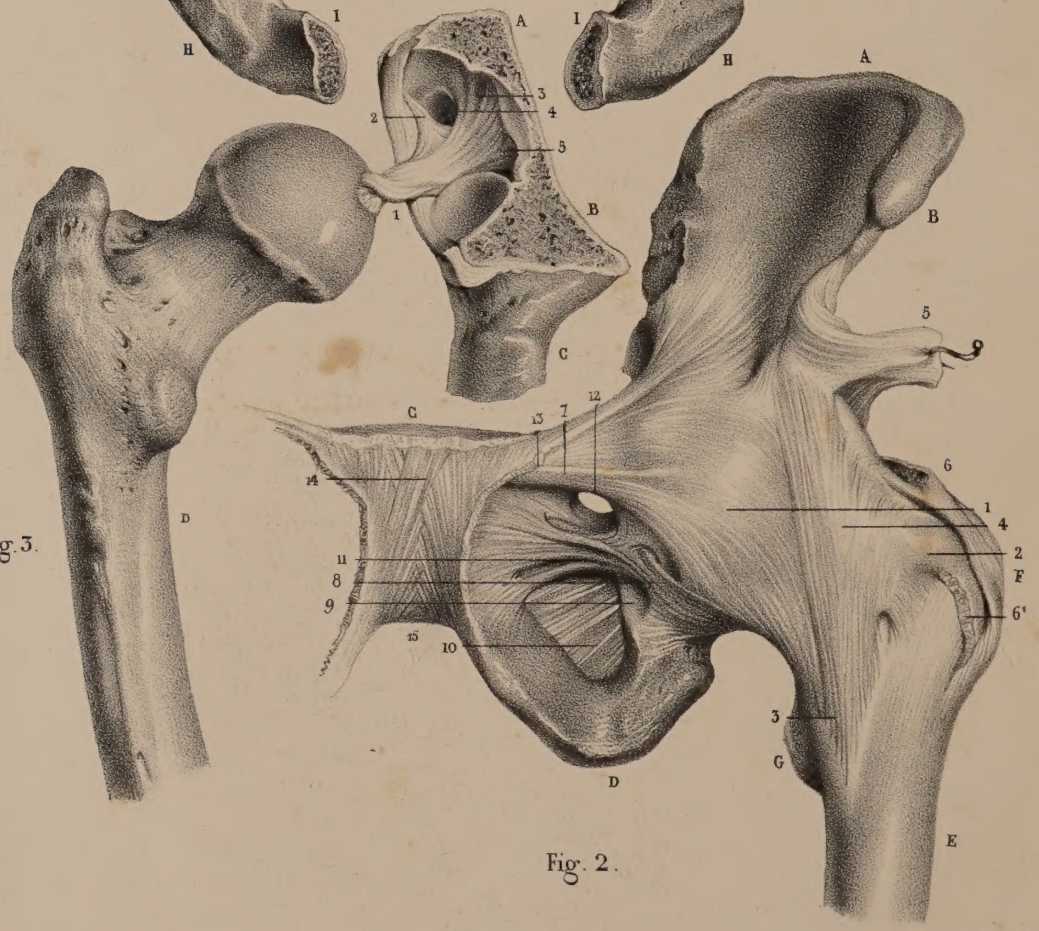

Fig. 3.

Fig. 2.

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PLATE XXIII.

APPARATUS OF LOCOMOTION—THE LIGAMENTS.

ARTICULATIONS OF THE BONES OF THE PELVIS. Fig. 1, *A*, Fourth lumbar vertebra; *B*, Sacro-vertebral articulation: *C*, sacrum; *D*, os coccygis; *E*, crest of the ilium; *F*, anterior and superior spinous process of the ilium; *G*, acetabulum; *H*, tuberosity of the ischium; *I*, ascending ramus of the ischium cut through; *J*, *K*, great sacro-sciatic notch; *L*, lesser sciatic notch.

1 Ilio-lumbar ligament, extending from the extremity and inferior edge of the transverse process of the fifth lumbar vertebra to the tuberosity of the crista ilii, 2, and to the neighbouring portion of the internal iliac fossa, 3; 4, 5, 6, superior sacro-iliac ligament, extending from the base of the sacrum to the opposed portion of the internal iliac fossa; 7—7, great sacro-sciatic ligament; 8, small sacro-sciatic ligament; 9, common anterior vertebral ligament; 10, anterior sacro-coccygeal ligament, composed of interlacing fibres which extend from the anterior aspect of the sacrum to the anterior aspect of the coccyx.

ARTICULATIONS OF THE THIGH-BONE AND PELVIS. Fig. 2, *A*, crest of the ilium; *B*, anterior superior spinous process of the ilium; *C*, symphysis pubis; *D*, tuber ischii; *E*, femur; *F*, great trochanter; *H*, lesser trochanter.

1, capsular ligament of the hip-joint. It forms a cylindrical fibrous sac, the upper orifice of which embraces the mouth of the acetabulum, and the inferior the neck of the thigh-bone close to the trochanters, 2—3; anteriorly the capsular ligament is strengthened by an oblique fasciculus, which proceeds from the tendon of the rectus femoris, 5, and from the anterior and inferior spinous process of the ileum. This is the fasciculus which has been particularly described under the name of the anterior and superior ligament of the hip-joint. Posteriorly and externally the gluteus parvus, 6, furnishes it with a very thick expansion; 6', tendon of the vastus externus. The capsular ligament is strengthened in addition anteriorly and internally by two fibrous fasciculi, one of which, 7, arises from the edge of the os pubis, the other, 8, from the margin of the acetabular notch, blending with the ligament which converts this notch into a canal; 9, acetabular notch; 10, obturator or sub-pubic membrane, strengthened immediately under the sub-pubic foramen by a fibrous slip, 11, of very considerable size; 12, sub-pubic foramen; 13, pubic insertion of Poupart's ligament; 14, anterior ligament of the symphysis pubis, formed of fasciculi which decussate on the mesial line, and become blended with the tendinous origins of the recti abdominis muscles; 15, sub-pubic or triangular ligament. Besides these two ligaments, the symphysis pubis is strengthened by an interosseous ligament, which occupies the whole of the surface of the opposed pubic bones.

HIP-JOINT. Fig. 3, *A*, *B*, anterior portion of the acetabulum; *C*, tuberosity of the ischium; *D*, posterior aspect of the femur.

1, Interarticular or round ligament of the hip-joint. This ligament arising from the pit in the head of the thigh-bone turns over upon this head and divides partially into several fasciculi, 2, 3, 4, 5, two of which attach themselves to the edges of the acetabular notch, and the others to the bottom of the acetabulum.

PLATE XXIII. *(Bis.)*

APPARATUS OF LOCOMOTION—THE MUSCLES.

ARTICULATIONS OF THE PELVIS AND HIP. Fig. 1, *A*, base of the sacrum; *B*, coccyx; *C*, crista ilii; *D*, tuber ischii; *E*, greater sacro-sciatic notch; *F*, lesser sciatic notch; *G*, femur; *H*, trochanter major; *I*, trochanter minor.

1, posterior sacro-iliac ligaments made up of several very powerful fasciculi extending between the transverse and articular processes of the two first sacral vertebræ to the internal aspect of the posterior superior spine and tuberosity of the ilium, which is very rough; 2, sacro-spinal ligament of Bichat, or posterior vertical sacro-iliac ligament, arising from the posterior superior iliac spine and inferior part of the iliac tuberosity, and inserted into the transverse process of the third sacral vertebra. Besides these and the other ligaments already described in PLATE XXIII. the sacro-iliac synchondrosis possesses a great number of ligamentous bands, which extend from the ilium to the sacrum; 3—4, posterior sacro-coccygeal ligament, attached superiorly to the edges of the sacral notch and inferiorly to the posterior surface of the os-coccygis. It consists of fibres which interlace in different directions, and it completes the extremity of the sacral canal behind; 5—6, obturator membrane; 7, obturator foramen; 8, great sacro-sciatic ligament, which arises from the iliac tuberosity, from the posterior and superior iliac spine, 9, from the sides and posterior aspect of the sacrum and from the coccyx, 10. It runs obliquely outwards and downwards to be inserted, 11, into the inner lip of the tuberosity of the ischium and into the ascending ramus of this bone, 12, by a falciform prolongation. The sacro-sciatic ligament is composed of fasciculi, several of which cross one another opposite its most contracted part; several of these fasciculi are continuous with the tendon of the biceps femoris 12'. 13, smaller sacro-sciatic ligament extending from the spine of the ischium to the sides of the sacrum and coccyx; 14, capsular ligament of the hip-joint which terminates behind at 14'—14', towards the middle of the neck of the femur but without being inserted there; at this part it presents a fibrous arch, which is reflected from behind forwards, and terminates in several small fasciculi at the base of the head of the femur.

KNEE-JOINT. Fig. 2, *A*, femur; *B*, internal tuberosity of the tibia; *C*, anterior tuberosity of the tibia; *D*, patella; *E*, fibula.

1, internal lateral ligament, arising at, 2, the internal condyle of the femur, immediately beneath the tubercle which gives origin to the adductor magnus, it then runs vertically downwards and forwards and is inserted at, 3, into the internal edge of the anterior aspect of the tibia. The deepest fibres of this ligament terminate at the internal tuberosity of the tibia; 4, tendinous expansion, sometimes called pes anserina; 5, tendon of the adductor magnus; 6, tendon of the semi-membranosus; 7, ligamentum patellæ. This ligament, of great strength, is that portion of the tendon of the extensors of the leg, which extends from the patella to the anterior tuberosity of the tibia; 8, tendon of the extensors; 9—10, synovial capsule of the knee slightly inflated; 11, internal ligament of the patella; 12, small ligamentous fasciculus which extends from the inner edge of the patella to the internal tuberosity of the tibia; 13, muscular fasciculus which is expanded on the superior part of the synovial capsule; 14, synovial capsule of the ligamentum patellæ. This capsule communicates occasionally with the capsule of the knee-joint.

KNEE-JOINT. Fig. 3, *A*, femur; *B*, anterior tuberosity of the tibia; *C*, head of the fibula; *D*, patella.

1, external lateral ligament, stretching between the external tuberosity of the femur and the outer aspect of the head of the fibula; 2, short external lateral ligament, arising from the inferior part of the external condyle of the femur, and adhering intimately to the external semilunar cartilage; it proceeds to terminate at the external tuberosity of the tibia and at the posterior part of the head of the fibula; 3, tendon of the vastus externus; 4, tendon of the outer head of the gastrocnemius; 5, 6, 7, synovial capsule slightly distended with air. It presents several inequalities determined by the fibrous bands which cross it at different places; 8, external semilunar cartilage; 9, synovial capsule of the ligamentum patellæ; 10—11, tendon of the extensors of the leg: 12, muscular fasciculus which expands over the superior and external lateral portions of the synovial capsule; 13, external ligament of the patella, extending from the external edge of this bone to the outer condyle of the femur; 14, insertion of the band of the fascia lata femoris; 15, anterior peroneo-tibial ligament, extending from the external tuberosity of the tibia to the head of the fibula; 16, interosseous ligament.

KNEE-JOINT. Fig. 4, *A*, femur; *B*, internal condyle; *C*, external condyle; *E*, fibula.

1, posterior ligament of the knee-joint. It is composed of several orders of fibres extending in different directions, some obliquely from above downwards and from within outwards, which belong to the tendon of the semi-membranosus, 2; others are expansions supplied by the popliteal muscles, 3, the inner head, 4, and the outer head, 5, of the gastrocnemius; lastly, some vertical fibres proceed directly from the femur to the tibia; 6, external lateral ligament embraced by the tendon of the biceps, 7'—7'; 8, internal lateral ligament; 9, posterior peroneo-tibial ligament; 10, interosseous ligament; 11, hole giving passage to an artery.

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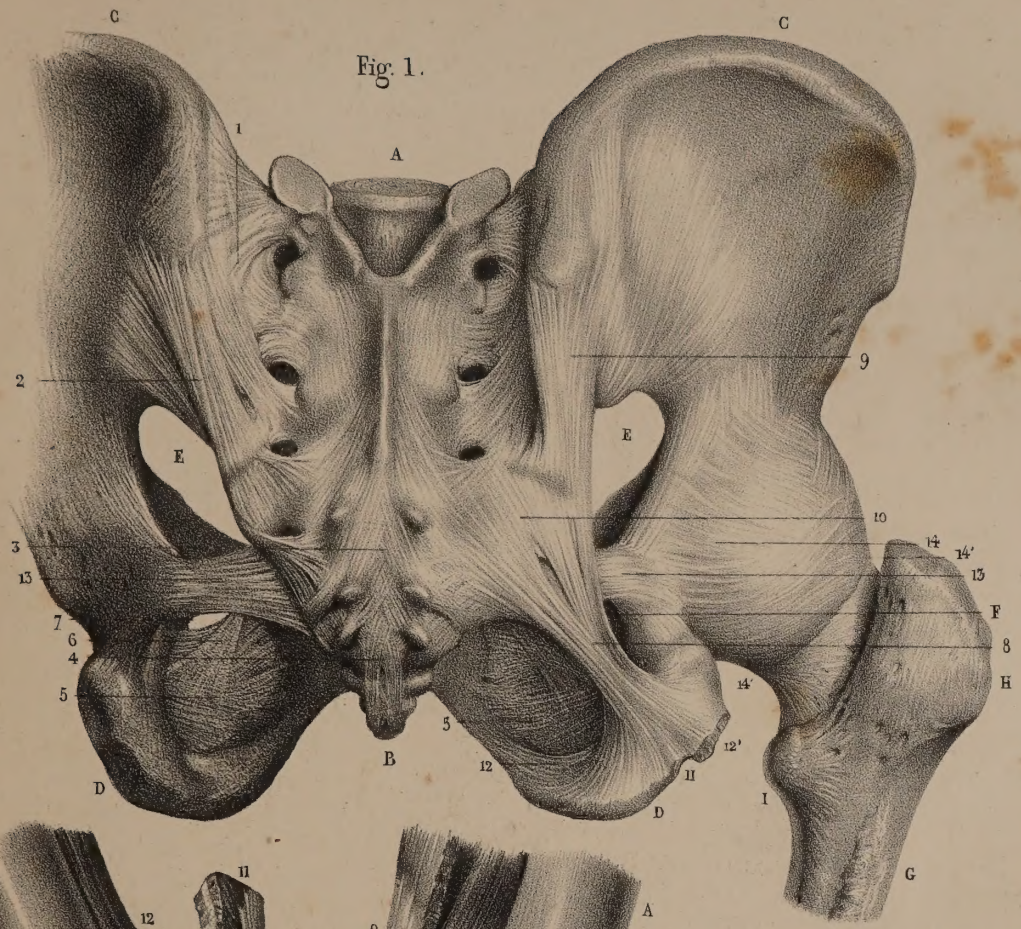

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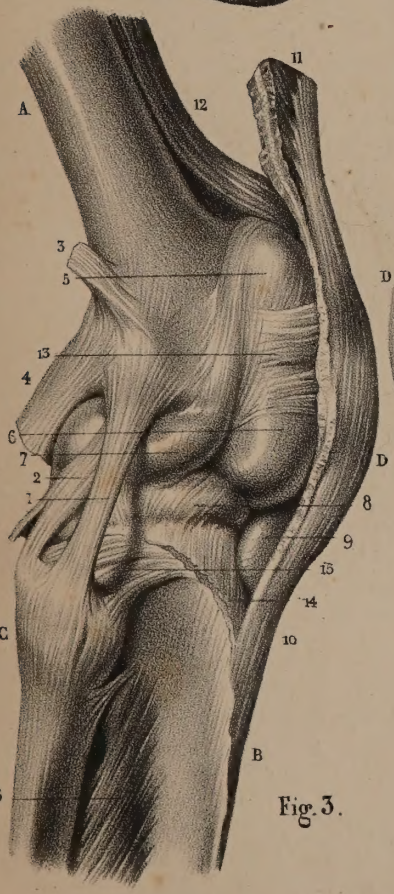

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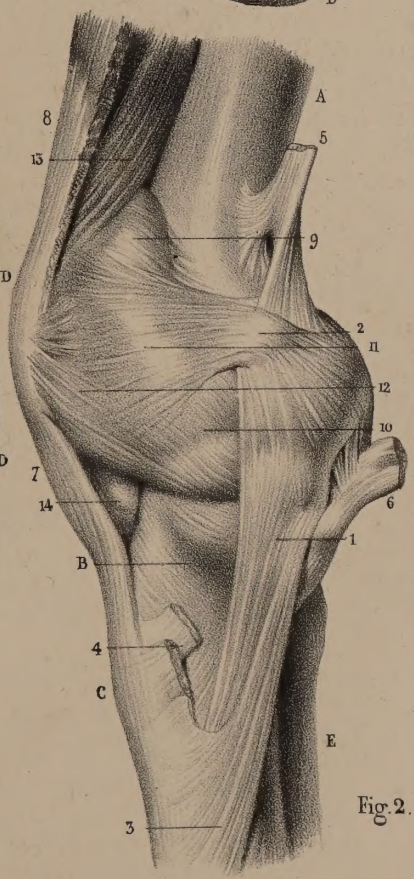

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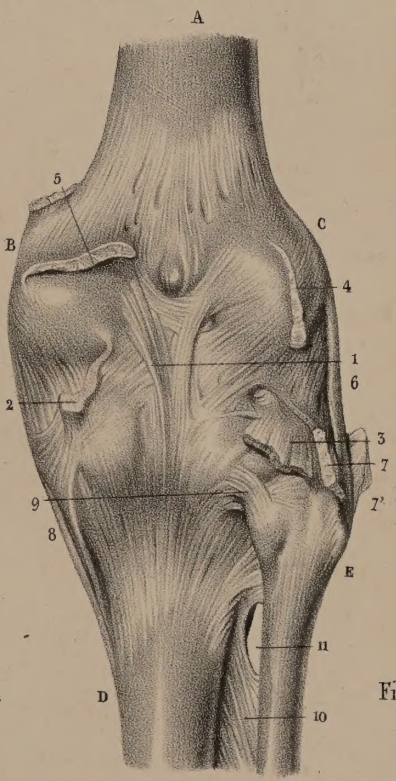

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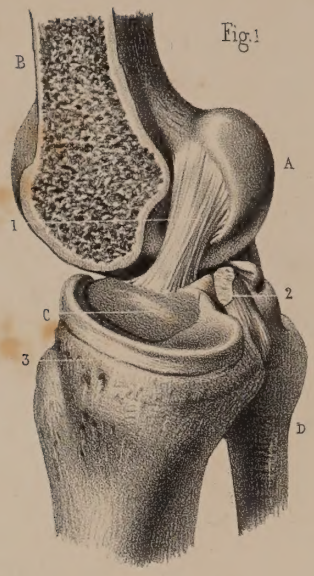

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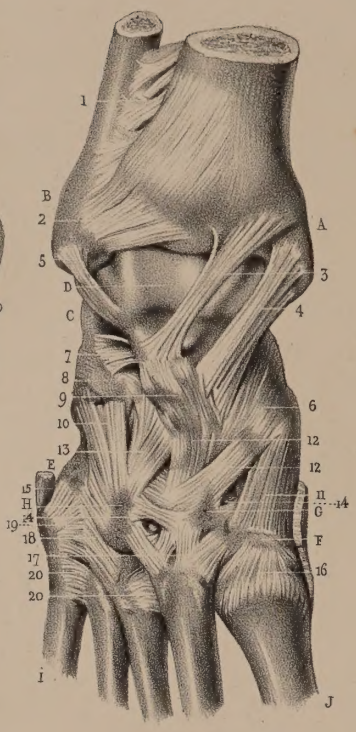

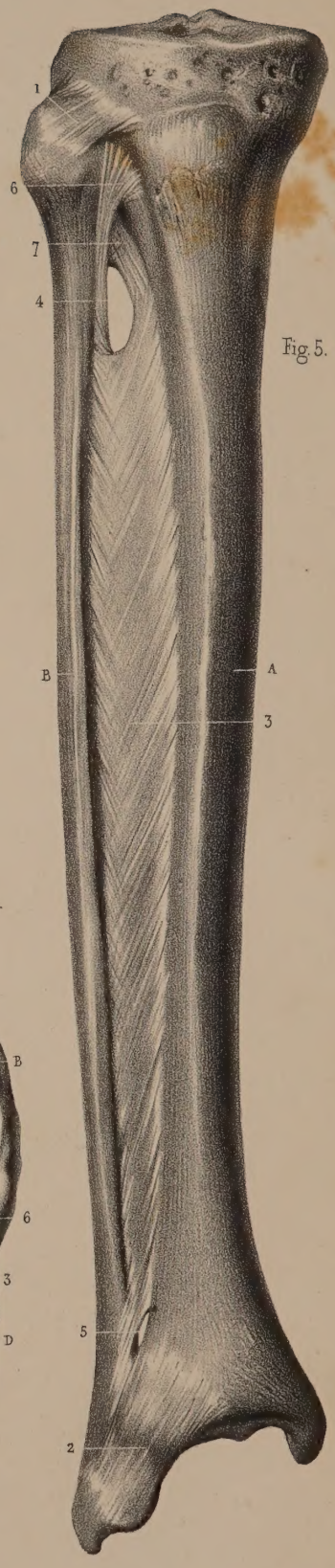

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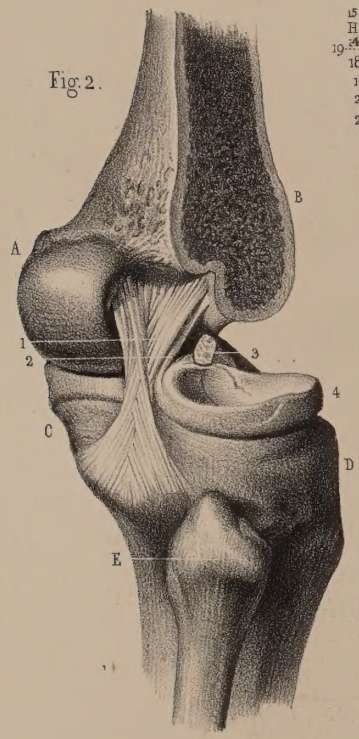

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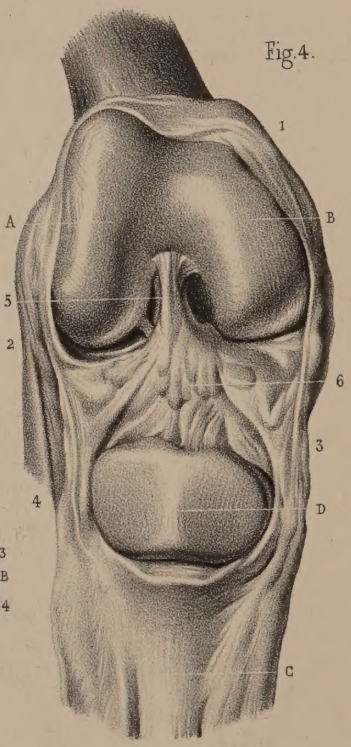

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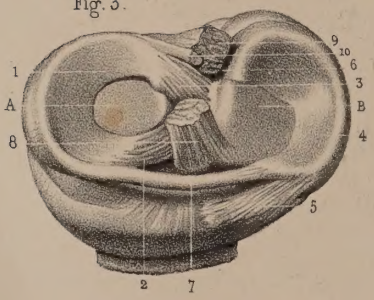

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PLATE XXIV.

APPARATUS OF LOCOMOTION—THE LIGAMENTS.

Fig. 1—4, Articulation of the knee. Fig. 1, *A*, External condyle of the femur; *B*, vertical section carried in the middle line between the two condyles; *C*, internal glenoid cavity of the tibia; *D*, fibula.

1, anterior crucial ligament, arising from the pit seen on the internal aspect of the outer condyle, and proceeding downwards and forwards to be implanted in front of the spine of the tibia, a few fibres being given off from it, which are attached to the internal semilunar cartilage; 2, posterior crucial ligament, divided near its insertion into the tibia; 3, external semilunar cartilage.

Fig. 2, *A*, internal condyle; *B*, section between the two condyles; *C*, internal tuberosity of the tibia; *D*, external tuberosity; *E*, head of fibula.

1, posterior crucial ligament, which is twisted as it were upon itself about the middle; the fibres which compose it are interlaced. Arising from a deep pit of the outer aspect of the inner condyle, it runs downwards and backwards to be inserted behind the posterior spine of the tibia. A considerable slip, 2, is detached from this ligament, which runs to be inserted into the external semilunar cartilage; 3, anterior crucial ligament, divided near its insertion into the tibia; 4, external semilunar cartilage.

Fig. 3, *A*, external glenoid cavity of the tibia; *B*, internal glenoid cavity.

1, external semilunar cartilage, connected with the tibia by two ligaments, one anterior, 2, inserted in front of the spine of the tibia, the other posterior, 3, inserted into the spine of the tibia itself; 4, internal semilunar cartilage, which is also attached to the tibia by two ligaments, one anterior, 5, inserted in front of the spine of the tibia near the anterior tuberosity, the other posterior, 6, inserted behind the spine of the tibia; 7, common transverse ligament, connecting the semilunar cartilages; 8, anterior crucial ligament; 9, posterior crucial ligament; 10, expansion which it sends to the external semilunar cartilage.

Fig. 4, *A B*, Condyles of the femur; *C*, tibia; *D*, internal aspect of the rotula.

1—2—3—4, synovial capsule which has been laid open; 5, adipose ligament; 6, synovial fimbriæ.

Fig. 5, Tibio-peroneal or fibular articulations. *A*, tibia; *B*, fibula.

1, anterior ligament of the superior tibio-fibular articulation; 2, anterior ligament of the inferior tibio-fibular articulation; 3, interosseous ligament, with its two openings, 4 and 5.

Fig. 6, Articulations of the foot, dorsal aspect; *A*, internal malleolus; *B*, external malleolus; *C*, os calcis; *D*, astragalus: *E*, os cuboides; *F*, first cuneiform; *G*, second cuneiform; *H*, third cuneiform bone; *I—J*, bones of the metatarsus.

1, Interosseous ligament; 2, anterior lig. of the inferior tibio-fibular articulation; 3, anterior lig. of the tibio-tarsal articulation, a ligament which is not very conspicuous; 4, anterior fasciculus of the internal lateral ligament of the tibio-tarsal articulation, its fibres running obliquely from the anterior edge of the internal malleolus to the neck of the astragalus; 5, anterior peroneo-astragalian lig.; 6, internal calcaneo-scaphoid lig. the trochleo-cartilaginosum of Weitbrecht. It extends obliquely from the lesser apophysis of the calcaneum to the dorsum of the os scaphoides; 8, lig. calcaneo-scaphoideum superius, running between the great apophysis of the calcaneum and the outer aspect of the scaphoides; 9, lig. astragalo-scaphoideum superius from the neck of the astragalus to the scaphoides; 10, lig. calcaneo-cuboideum superius, beneath which there lies another very strong lig. the lig. calcaneo-cuboideum internum; 11, ligament which unites the scaphoid with the first cuneiform; 12—12, ligaments between the scaphoid and second cuneiform: 13, lig. between the scaphoid and third cuneiform; 14—14, inter-cuneiform ligaments; 15, lig. between the cuboides and third cuneiform; 16, dorsal ligament between the first metatarsal and the first cuneiform; 17, dorsal ligaments, three in number, of the articulation between the second metatarsal and tarsal bones; 18, ligaments of the articulation between the third metatarsal and the tarsal bones; 19, lig. of the fifth metatarsal and cuboid bone; 20, dorsal lig. connecting the posterior extremities of the metatarsal bones together.

PLATE XXIV *(Bis.)*

APPARATUS OF LOCOMOTION—THE LIGAMENTS.

Figs. 1, 2, 3, Tibio-tarsal articulation. Fig. 1, *A*, internal malleolus; *B*, external malleolus; *C*, calcaneum.

1, interosseous ligament; 2, posterior ligament of the ankle-joint; 3, external lateral ligament of the same—lig. peroneo-calcaneum; 4, lig. peroneo-astragaleum, arising from a pit behind and to the inside of the outer malleolus, it expands and is inserted into the posterior aspect of the astragalus; 5, posterior fasciculus of the lig. tibio-calcaneum, the posterior lateral lig. of the ankle-joint; 6, pulley in which plays the tendon of the flexor communis digitorum; 7, pulley of the tibialis posticus.

Fig. 2, *A*, malleolus internus; *B*, calcaneum; *C*, first metatarsal.

1, 2, 3, Internal lateral lig. of the ankle-joint; arising from the anterior edge of the internal malleolus, its fibres diverge and are inserted anteriorly, 1, into the neck of the astragalus, and into the inal aspect of the astragalus, 2, and posteriorly into the smaller apophysis of the calcaneum 3; 4, groove of the flexor communis; 5, lig. calcaneo-scaphoideum internum, the trochleo-cartilaginosum of Weitbrecht. It is as dense as cartilage and extends from the small process of the os calcis to the dorsum of the scaphoides; moulded upon the internal part of the astragalus, it presents a groove or pulley externally, in which plays the tendon of the tibialis posticus; 6, tendon of the tibialis posticus; 7, tendon of the tibialis anticus; 8, ligament which connects the scaphoides with the first cuneiform; 9, lig. which connects the scaphoides with the second cuneiform; 10—10, ligaments connecting the first metatarsal with the first cuneiform.

Fig. 3, *A*, Malleolus externus; *B*, calcaneum; *C*, process of the calcaneum; *C*, trochlea of the astragalus; *D*, neck of the astragalus; *E*, cuboid bone; *F*, fifth metatarsal; *G*, fourth metatarsal.

1, anterior lig. of the inferior tibio-fibular articulation; 2, external lateral lig. of the ankle-joint, the peroneo-calcaneum externum; 3, external lateral lig. of the ankle-joint or peroneo-astragaleum anterius; 4, lig. calcaneo-astragaleum externum; 5, lig. interosseum calcaneo-astragaleum; 6, lig. calcaneo-cuboideum inferius; 7, lig. dorsale obliquum, uniting the fifth metatarsal with the cuboides; 8, dorsal lig. of the fourth metatarsal.

Fig. 4, 5, 6, 7, Articulations of the foot.

Fig. 4, Plantar aspect; 1—2, lig. calcaneo-cuboideum inferius,—the strongest ligament of the foot, it extends from the inferior aspect of the calcaneum to the whole of the os cuboides which is behind the pulley, 3; the superficial layer of the ligament also passes over the pulley, 3, and proceeds forwards to give attachments to the muscles of the plantar region; 4, lig. calcaneo-scaphoideum inferius; of a triangular form, this ligament extends from the small apophysis of the calcaneum to the inferior aspect of the scaphoides; 5, plantar lig. which connects the scaphoides with the first cuneiform bones, it is formed by the tendon of the tibialis posticus, 6, which is inserted into the scaphoides and first cuneiform. From this tendon a considerable expansion, 7, proceeds, to be attached to the cuboides, the third cuneiform, and third metatarsal bone; 8, plantar lig. of the articulation between the first metatarsal and first cuneiform bones; 9, tendon of the tibialis anticus; 10, of the pronæus longus, 11, 12, 13, plantar ligs. connecting the posterior extremities of the metacarpal bones together; 14, 15, lig. transversum metatarsi; 16, 17, pulleys of the flexor tendons.

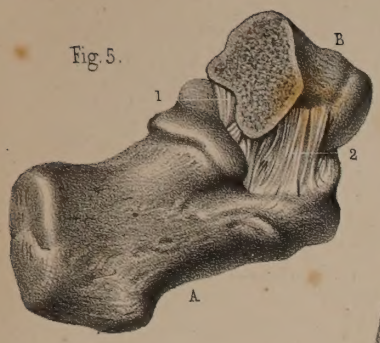
Fig. 5, *A*, calcaneum; *B*, astragalus, the posterior half of which is removed; 1—2, lig. calcaneo-astragaleum interosseum.

Fig. 6, *A*, scaphoides; *B*, cuboides; *C*, *D*, *E*, first, second, and third cuneiform bones; *F*, *G*, *H*, *I*, *J*, first, second, third, fourth and fifth metatarsals.

1, interosseous ligament connecting the scaphoides and cuboides; 2, 3, interosseous ligs. connecting the cuneiform bones together; 4, interosseous lig. connecting the cuboides with the third cuneiform; 5, small interosseous ligament extending from the cuboides to the posterior and external angle of the third cuneiform; 6—6, interosseous lig. between the first cuneiform and second metatarsal; 7, interosseous lig. between the third cuneiform and the third and fourth metatarsals; 8, lig. between the second cuneiform and second metatarsal; this lig. is at once interosseous and plantar; 9, interosseous ligs. uniting the posterior extremities of the metatarsals together.

Fig. 7, 1, 2, 3, external and internal lateral ligs. which connect the first phalanges with the bones of the metatarsus, the first with the second, and the second with the third phalanges. The external lateral ligs. are much stronger than the internal lateral ligaments.

Fig. 5.



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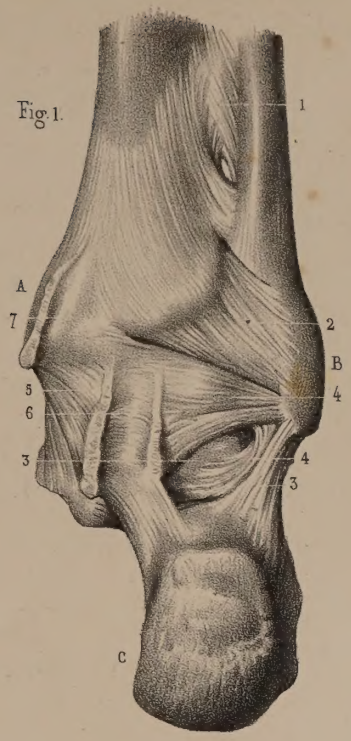


Fig. 4.

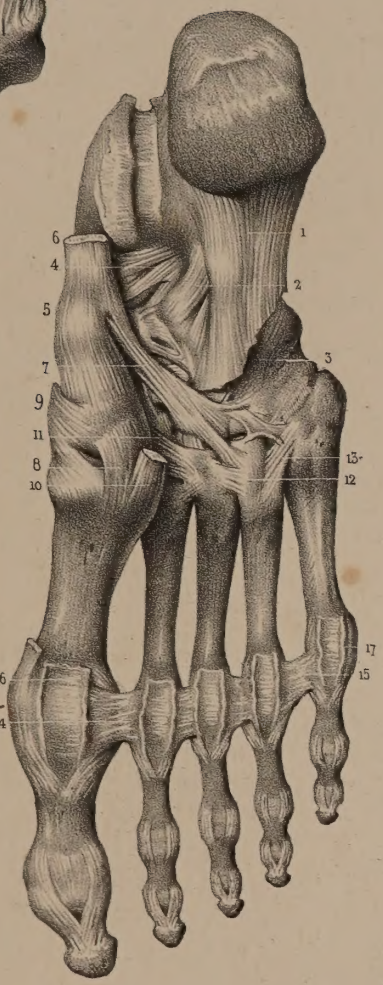


Fig. 6.

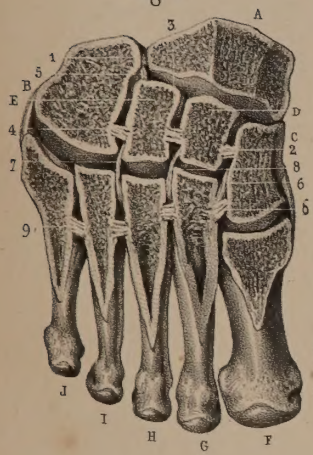


Fig. 2.

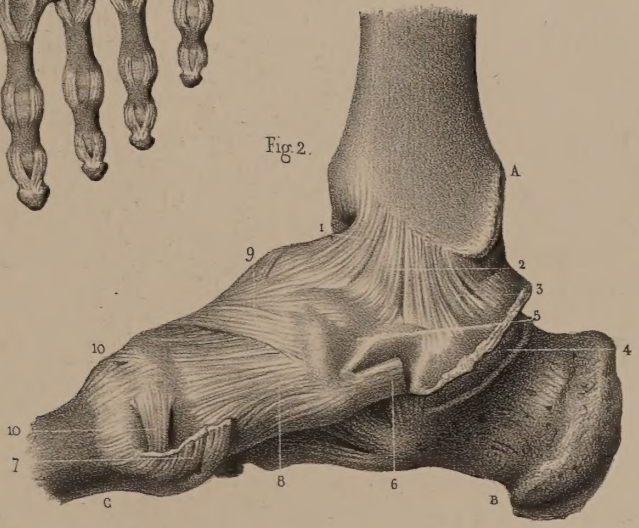
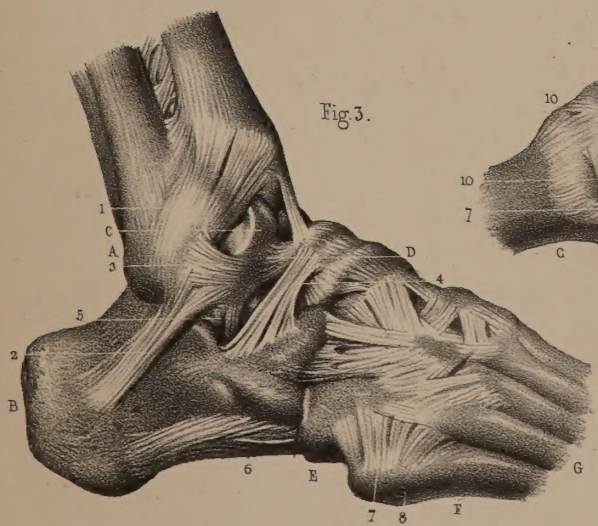


Fig. 3.



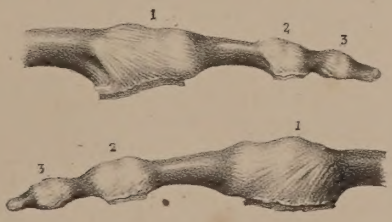


Fig. 7.

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Pl. 25.

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Offic. litho. Artus

PLATE XXV.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

POSTERIOR REGION OF THE TRUNK.

SUPERFICIAL LAYER OF MUSCLES, *a*.

A, the occipital bone; *B*, the occipital protuberance; *C*, the mastoid process; *D*, the spine of the scapula; *E*, the spinous process of the seventh cervical vertebra; *F*, the spinous process of the twelfth dorsal vertebra; *G*, the inferior angle of the scapula; *H*, the acromion process.

1, 2, 3, the trapezius muscle, divided into three portions; 1, the superior portion; 2, the middle portion; 3. the inferior portion. 1', 2', 3', corresponding portions of the trapezius of the left side; 4. inferior angle of the trapezius; 5. line of separation between the middle and inferior portions; 8, superior angle where it is inserted into the occipital protuberance and the superior curved line of the occipital bone by a lamella of fibres. An aponeurotic expansion, 17, from the posterior border of the sterno-cleido-mastoideus, 16, covers these insertions; 9, a tendinous band, which is continuous with the aponeurosis of the trapezius and the subjacent muscles; 6', 6', 8', decussation of the tendinous fibres at the median line. This decussation is effected in such a manner that the fibres, 6, of the right trapezius, after crossing the median line, are lost in the fibres of the splenius capitis of the left side, and the fibres, 6', of the left trapezius become the fibres of the splenius capitis of the right side. As this disposition of the fibres is analogous to that of the muscles of the abdomen, we shall call this aponeurosis the posterior cervical linea alba. The horizontal fibres of the middle portion, 2, are inserted into a very thick aponeurosis, of which the superficial plane is continuous with the two sides of the median line, and the deep seated plane is firmly attached to the spinous processes of the three last cervical and the first dorsal vertebra, 11', the ligamentum nuchæ of English anatomists; 7—7, insertions of the inferior portion into the spinous processes of the dorsal vertebræ, by tendinous fibres which are longer inferiorly than superiorly, 10; 11—11, supra-spinous ligament which adheres strongly to the tissue of the skin. To the insertion of the latter are to be ascribed the grooves in the extremities of the spinous processes of the dorsal and lumbar vertebræ; 12—12, insertions of the middle portion by tendinous fibres into the superior edge of the acromion and the posterior border of the spine of the scapula; 13 and 14, the tendon of the inferior portion—it slides over the small triangular surface at the internal extremity of the spine, and is inserted into the whole of its posterior border, 15; 18, the levator anguli scapulæ; 20—20, the deltoid muscle; 21, the long head of the triceps; 22, the infra-spinatus; 23, the teres minor; 24, the teres major; 25, its insertion into the inferior angle of the scapula; 26—26, the latissimus dorsi; 27—27, its tendon; 27', the tendon of the latissimus dorsi of the opposite side; 26', the rhomboideus.

PLATE XXVI.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

POSTERIOR REGION OF THE TRUNK.

SUPERFICIAL LAYER OF MUSCLES, *b*.

A, spinous process of the sixth dorsal vertebra; *B*, spinous process of the twelfth; *C*, spinous process of the third lumbar vertebra; *D*, the crista ilii; *E*, the coccyx; *F*, the great trochanter.

1, the latissimus dorsi; 2, its superior border; 1', the latissimus dorsi of the opposite side; 3—4, insertion of its muscular fibres into the tendon; 5—9, tendon of the latissimus dorsi; the superior portion, 5, is composed of fibres that run in a horizontal direction, and are inserted into the spinous processes of the dorsal vertebræ; the inferior portion, 5'—9, is formed by fibres which decussate with each other and are inserted into the lumbar and sacral spinous processes. In these decussations, part, 6—10, are directed obliquely from above downwards and from without inwards, and belong to the latissimus dorsi: the others, 6'—7, 9—10, run obliquely from below upwards, and from without inwards, and belong to the oblique and transversalis muscles of the abdomen and to the gluteus maximus; 8'—8, insertion of the latissimus dorsi into the posterior third of the crista ilii; 11—11, the gluteus maximus; 12, the gluteus medius; 13, the teres major; 14, a fleshy slip which connects it with the latissimus dorsi; 15, the infra spinatus; 16, the rhomboideus; 17, the obliquus externus abdominis.

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Pl. 27.

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PLATE XXVII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

POSTERIOR REGION OF THE TRUNK.

SECOND LAYER OF MUSCLES.

A, the occipital bone; *B*, the occipital protuberance; *C*, the mastoid process; *DD*, the rami of the inferior maxillary bone; *E*, the clavicle; *F*, the spine of the scapula; *G*, the inferior angle of the scapula.

1 and 2, the rhomboideus muscle divided into two portions; 1, the inferior portion; 2, the superior portion; (the superior portion is usually called rhomboideus minor, the inferior rhomboideus major;) 3—4, insertions of the muscle by tendinous fibres into the spinous processes of the three last cervical and three upper dorsal vertebræ; 5, origin of the rhomboideus from the inferior angle of the scapula, and from its posterior border (base;) 6, foramen for the passage of vessels; 7, the levator anguli scapulæ; 8, its insertion into the superior angle, and superior portion of the posterior border (base), of the scapula; 9, 10, 11, the serratus posticus superior, which is inserted by three fasciculi into the superior borders of the second, third, and fourth ribs; 12, 13, 14, origin of the serratus posticus superior, by a tendinous band, from the spinous processes of the four last cervical and two upper dorsal vertebræ. This tendinous band is intimately connected with the tendons of the trapezius 15, the rhomboideus and splenius muscles, and, in great measure, forms the posterior cervical ligament, which is also joined by some fibres which are inserted into the occipital protuberance (see Plate XXV): these fibres are sometimes replaced by a small straight muscle, 16; 17—18, the splenii muscles; 19, origin of the splenius from the occipital, and from the mastoid portion of the temporal, bone; 20, the inferior extremity of the splenius; 21, the complexus; 22, its insertion into the superior curved line of the occipital bone; 23, the transversalis calli; 24, the scalenus muscle; 25, the cervicalis ascendens (descendens;) 26, the inferior portion of the transversalis colli; 27, spinalis dorsi (transverso-spinalis;) 28, the longissimus dorsi; 29, the sacro lumbalis; 30, the spinous processes of the dorsal vertebræ; 31—31, the serratus magnus; 32, the latissimus dorsi; 33, the tendon of the serrati postici; 34, the supra-spinalis; 35, the infra-spinalis; 36, the teres major.

PLATE XXVIII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

POSTERIOR REGION OF THE TRUNK.

THIRD LAYER.

A, the occipital bone; *B B*, the parietal bones; *C C*, the angles of the inferior maxillary bone; *D D*, the ribs.

1 and 2, the splenius muscle divided into two portions, the internal and superior portion, 1, has the name of splenius capitis; the external and inferior portion is called the splenius colli; 3—5, insertions of the splenius into the posterior cervical linea alba (see Plate XXV), and into the last cervical, and six upper dorsal, vertebræ. The tendinous fibres by which they are inserted are longer inferiorly than superiorly, 4; 6, common tendon of the trapezius, rhomboideus, serratus posticus superior, and splenius muscles; 7—8, origin of the splenius from the external third of the superior curved line of the occipital bone, 7, and from the mastoid portion and mastoid process of the temporal, 8; 9—9, the complexus muscle; 10, its digastric portion: (this and the following are often named as a separate muscle, the biventer cervicis); 11, its spinous portion; it is inserted into the spinous processes of the last cervical, and three upper dorsal vertebræ; 12—12, tendon of the complexus, which is inserted into the transverse processes of the six superior dorsal vertebræ; 13, origin of the complexus from the two internal thirds of the superior curved line of the occipital bone, and from the rough surface between it and the inferior curved line; 14, the complexus minor, or trachelo-mastoideus; 15, its origin from the posterior edge of the mastoid process; 16, the digastricus; 17, transversalis colli; 18, the cervicalis descendrus; 19 and 19, the scaleni muscles; 20, the longissimus dorsi; 21, the spinalis dorsi (transverso-spinalis;) 22, the sacro lumbalis; 23—23, the levatores costarum; 24—24, the costo-transverse ligaments; 25—25, the external intercostal muscles.

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PLATE XXIX.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

POSTERIOR REGION OF THE TRUNK.

FOURTH LAYER.

A, the occipital bone; *B*, the parietal bones; *C*, the angles of the inferior maxillary bone; *D*, the atlas; *E*, the spinous process of the axis; *F*, the spinous process of the first dorsal vertebra; *G G*, the ribs; *H*, the crest of the ilium; *I*, the os coccygis.

1—1', common mass of the muscles of the back, covered by a broad aponeurosis, 2—2', 3—3'. This common tendon or aponeurosis is very thick and dense in the sacral region, 2—2'. It is inserted, externally, into, 4, the posterior part of the crista ilii; 5, the posterior superior spinous process of the ilium; and 6, into a series of eminences which represent the transverse processes of the sacral vertebræ; internally, 7, the fibres cross at the median line and are inserted into the sacral ridge or crista. In the lumbar region, 3—3', this aponeurosis forms parallel bands, which are inserted into the spinous processes of the lumbar and three inferior dorsal vertebræ. Inferiorly it terminates in a long narrow process, 8, which is intimately connected with the sacro-coccigeal ligament; 9—9, the sacro-lumbalis; 10, its accessory slip, or, cervicalis discendens: the posterior plane of the sacro-lumbalis is composed of obliquely ascending fibres, that are inserted into the angles of the ribs; 11—11, by flat narrow tendons, which are longer above than below; 9'—9', the sacro-lumbalis of the right side; 10, its accessory slip, separated from the longissimus dorsi and turned outward: the anterior plane of the sacro-lumbalis is composed of obliquely descending fibres, 11'—11', which are inserted into the angles of the ribs by tendinous slips. The inferior bands of fibres are thick and short: the superior are longer and flatter; 12, the longissimus dorsi: its posterior aspect is covered in great part by the common aponeurosis, and may be considered as being inserted by the parallel band mentioned above; 13---13, accessory slip of the longissimus dorsi or transversalis colli; 14, the complexus minor, or trachelo-mastoideus: this muscle may be considered as another accessory slip of the longissimus dorsi, continuing it up to the head; 12', superior portion of the longissimus dorsi separated from the spinalis dorsi, and turned outwards; 13', transversalis colli, and 14, trachelo-mastoideus, separated from the complexus and turned outwards: the complexus has been here entirely removed; 15---15, tendinous insertions of the longissimus dorsi, into the transverse processes of the upper dorsal vertebræ: these tendons form part of the series of the insertions of the longissimus dorsi into the transverse processes of the dorsal, and the articulating processes of the lumbar vertebræ (see Plate XXX); 16---16, tendons of the transversalis colli, which are inserted into the transverse processes of the eight upper dorsal vertebræ; 17---17, insertion of the complexus minor or trachelo-mastoideus, into the angle formed between the transverse and articulating processes of the four inferior cervical vertebræ: it is also sometimes inserted into the transverse processes of the two upper dorsal vertebræ; 18---18, external fasciculi of the longissimus dorsi, which are inserted by tendinous slips into the space comprised between the angles of the six lower ribs and the apices of the transverse processes: they are very variable in their number; 19---19, the spinalis dorsi in the neck and in the spine: in the lumbar region, it is covered by the common aponeurosis; 20---20, insertions of the spinalis dorsi into the transverse processes of the dorsal, and into the articulating processes of the cervical, vertebræ; 21---22---23, insertion of the spinalis dorsi into the spinous processes of the cervical and dorsal vertebræ; 24, the complexus; 25, its insertion

tion into the inner half of the superior curved line of the occipital bone, and into the rough surface between the two curved lines of that bone; 26, the rectus capitis posticus minor, which arises from the occipital bone, below the inferior curved line, and is inserted into the tubercle of the atlas; 26', part of the rectus posticus minor, which is continuous with the posterior cervical ligament; 27, rectus capitis posticus major, which arises from the occipital bone, externally to the preceding muscle, and is inserted into the spinous process of the axis; 28, obliquus capitis inferior or major, extending from the spinous process of the axis to the transverse process of the atlas, 28'; 29---30, obliquus capitis superior or minor, extending from the inferior curved line of the occiput to the transverse process of the atlas; 31, the obliquus externus abdominis; 32, the obliquus internus abdominis; 33---34, tendon of the transversalis abdominis; 35, the gluteus maximus; 36, its tendinous origin; 37, the gluteus medius.

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Offic. Lith. Artus.

PLATE XXX.

APPARATUS OF LOCOMOTION—THE MUSCLES.

POSTERIOR REGION OF THE TRUNK.

FIFTH LAYER.

A, occipital bone; *B*, mastoid process; *C*, posterior arch of the atlas; *D*, spinous process of the seventh cervical vertebra; *E*, *E*, angles of the lower jaw; *F*, *F*, ribs; *G*, crest of the ileum; *H*, coccyx.

1, common mass of the posterior spinal muscles covered by a very thick aponeurosis. Almost without particular division in the sacral region, this common mass divides in the lumbar region into two fasciculi: one external, 2—3, common to the sacro-lumbalis and longissimus dorsi, the other internal, 4, the transverso-spinalis, to obtain a view of which, it is necessary to divide the thick investing fascia, and to turn outwards the common mass of the sacro-lumbalis and longissimus dorsi. The sacro-lumbalis, 2, becomes distinct from the longissimus dorsi, 3, about the middle of the lumbar region. Although blended at its origin with the longissimus dorsi, the sacro-lumbalis still arises more particularly by a very strong tendon, 5, from the tuberosity of the ilium and the neighbouring portion of the crest of that bone. In the dorsal region, the sacro-lumbalis is composed of two orders of fasciculi, 6, 6', connected together by aponeurotic slips, 7; the ascending fasciculi, 6, belong to the sacro-lumbalis, properly so called, and are inserted into the angles of the ribs by thin flattened tendons, 8, 8 (see PLATE XXIX.); the descending fasciculi, 6—6',—fasciculi accessorii of the sacro-lumbalis, are inserted by a series of tendons, 9—9, into the angles of the ribs and posterior tubercles of the transverse processes of the three lowest of the cervical vertebræ. These accessory muscular slips of the sacro-lumbalis are described by Diemerbroeck and Albinus under the title of cervicalis descendens, by Steno under that of accessorius ad sacro-lumbalem. The slip, 10, supplied by the sacro-lumbalis to the twelfth rib, is of very considerable size, and may be viewed as in some sort distinct from the common mass. The longissimus dorsi, 2, terminates in two orders of fasciculi which come off from its anterior aspect: the external or costal fasciculi, 11—11, inserted into the ten lowest ribs and the transverse processes of the lumbar vertebræ, 11'—11', which are the analogues of the ribs, and the internal or transversary fasciculi, 12—12, inserted into the summits of the transverse processes of the dorsal vertebræ and into the tubercles of the articular processes of the lumbar vertebræ, 12'—12', which are the analogues of the dorsal transverse processes; 13—13, transversalis colli, arising from the posterior tubercles of the transverse processes of the six inferior cervical vertebræ, and inserted by tendons which are successively longer and longer as they are more inferior, into 14—14, the apices of the transverse processes of the five superior dorsal vertebræ. Sometimes this muscle has an attachment to the transverse process of the atlas, by means of a slender slip, 15, which is intimately connected with the superior fasciculus of the angularis; 16, spinalis dorsi, arising by three tendons, 17—18—19, from the spinous processes of the two last dorsal and first lumbar vertebræ, and terminating in small tendons, many of which are bifid, to be inserted into the summits of the spinous processes, 20—20, of the first six dorsal vertebræ. This muscle cannot be entirely separated from the longissimus dorsi, with which it is confounded by means of one or two of its commencing tendons 19—19'; 21—22—23'—23'—24—24', transverso-spinalis, filling the great vertebral gutters from the sacrum to the atlas; it is composed of a series of superposed fleshy fasciculi of different lengths, which extend from the spinous processes to the transverse processes of the dorsal vertebræ, and to the articular processes of the cervical and lumbar vertebræ. The transverso-spinalis, 21, is covered in the sacral region by the common aponeurosis, 25—25, which must be removed, taking care to divide the fleshy fasciculi, 26—26, properly, these taking their origin from it. This aponeurosis, although it furnish numerous attachments to

the transverso-spinalis, belongs, properly speaking, to the common mass, 28, of the sacro-lumbalis and longissimus dorsi; 27, posterior vertical sacro-iliac ligament. The transverso-spinalis in the dorsal and cervical regions divides into two layers: one superficial, 23—24, which has been described as the semispinalis colli and semispinalis dorsi; the other deep, 23'—24', which is the complexus; 29—29'—29,' tendons of insertion of the superficial layer of the transverso-spinalis, which has been removed on the left side, to expose the deep layer. The fasciculi of the superficial layer are much longer than those of the deep layer; they pass over from four to six vertebræ between the points of their origins and insertions; 30—30', interspinalis cervicis; 31—31', posterior smaller straight muscles of the head—recti postici capitis minores; 32—32,' obliqui superiores; 33—33', digastrici; 34—34,' levatores costarum; 35,' quadratus lumborum; 36—36', intertransversales; 37—37', costo-transversal ligaments.

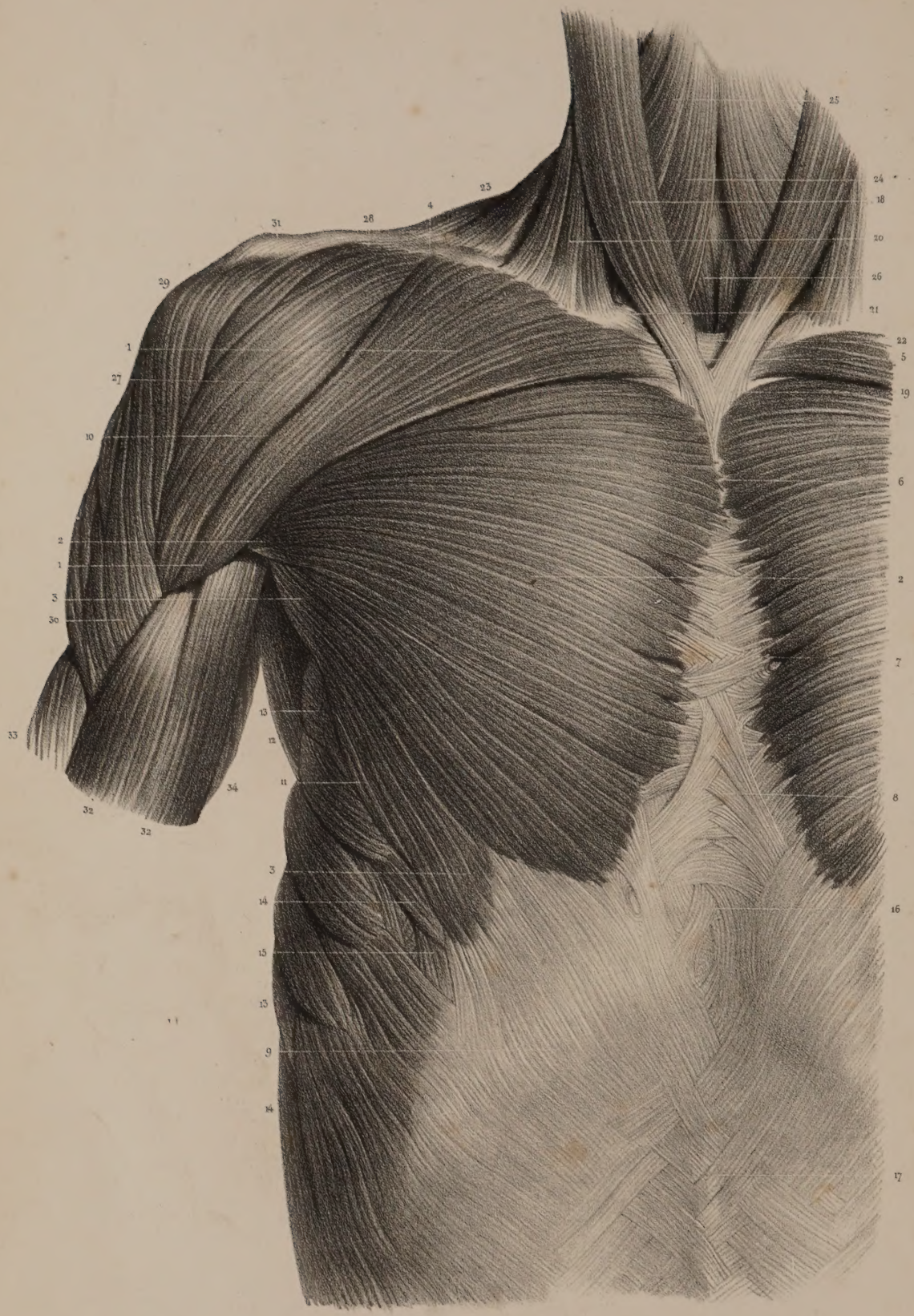

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PLATE XXXI.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ANTERIOR REGION OF THE TRUNK.

SUPERFICIAL LAYER, *a*.

1—1, 2—2, 3—3, the pectoralis major, composed of three portions. The superior or clavicular portion, 1—1, arises, by short tendinous fibres, 4—5, from the internal half of the anterior border of the clavicle, and from the anterior and superior part of the sternum. The middle or thoracic portion, 2—2, which is broad and radiated and is separated from the superior one by a line of cellular tissue, arises from the anterior surface of the sternum, from the cartilages and from the extremities of the second, third, fourth, fifth, and sixth ribs. At the superior part of the sternum, 6, it arises by fleshy fibres, which decussate with those of the muscle of the opposite side: at the middle and inferior part of that bone, it arises by tendinous fibres which decussate with those of the muscle of the opposite side and of the rectus, and obliquus internus abdominis. Below the ensiform cartilage, these fleshy fibres terminate in the aponeurosis of the abdomen by a broad fibrous expansion, 9; the inferior or abdominal portion, 3—3, is but an accessory slip of the middle one, from which it is often, however, so distinct as to be mistaken for the first digitation of the obliquus externus. From these origins the fibres of the pectoralis major converge towards the upper part of the arm; the clavicular portion, which is separated from the anterior border of the deltoid by a narrow cellular space, 10, which lodges the cephalic vein and the acromial artery, descends in front of the thoracic portion; the abdominal portion, together with some of the inferior fibres of the thoracic, is twisted gradually upon itself and runs up behind the two other portions, with which it forms a flat tendon which is inserted into the anterior border of the bicipital groove of the humerus; 11, the pectoralis minor, covered by the pectoralis major; 12, external border of the latissimus dorsi; 13—13, origins of the serratus magnus anticus, indigitating with those of the obliquus externus, 14—14; 15, the rectus abdominis; 16—17, the linea alba abdominis; 18, anterior or sternal portion of the sterno-cleido-mastoideus: this portion of the muscle is thick and rounded, and is inserted into the anterior and superior part of the sternum, by a tendon, 19, which decussates with the tendon of the opposite side; 20, posterior or clavicular insertion of the sterno-cleido-mastoideus: this portion is broad and thin, and is inserted by tendinous fibres into the posterior border and superior surface of the clavicle, into the sterno-clavicular articulation, and sometimes into the superior part of the sternum. These two portions, though quite distinct at their insertion, are united about the middle of the neck; 22, the interclavicular ligament; 23, anterior portion of the trapezius; 24, the sterno-hyoideus; 25, the omo-hyoideus; 26, the sterno-thyroideus; 27, anterior portion of the deltoid; 28, its origin from the external third of the anterior border of the clavicle; 29, middle portion of the deltoid; 31, its origin from the inferior border of the acromion process; 32, the biceps flexor cubiti; 33, the brachialis anticus; 34, The triceps extensor cubiti.

PLATE XXXII.

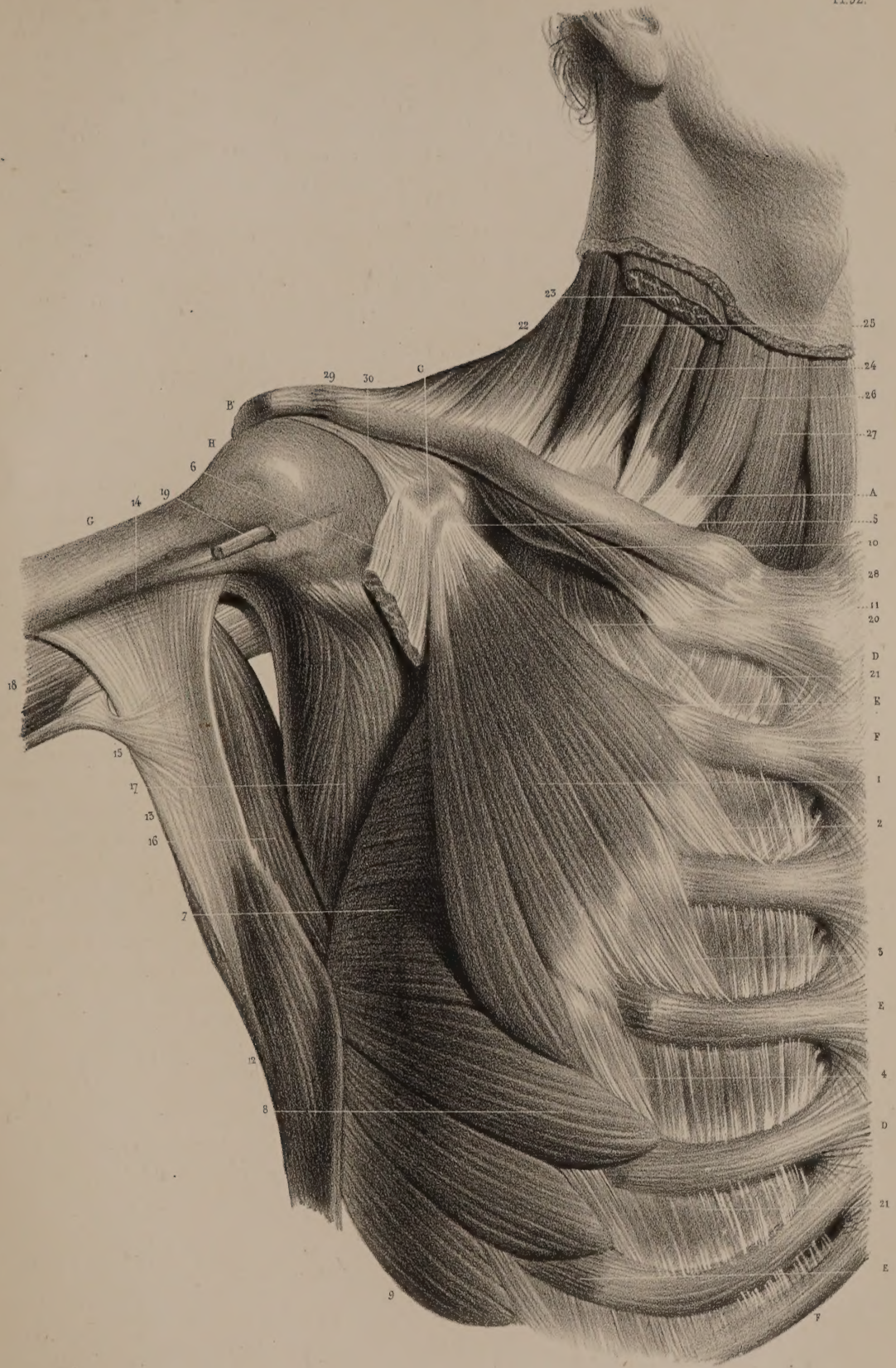
APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ANTERIOR REGION OF THE TRUNK.

SECOND LAYER, *a*.

A, the clavicle: *B*, the acromion process: *C*, the coracoid process: *D*—*D*, the sternum: *E*—*E*, anterior extremities of the second, fourth, and sixth ribs. *F*—*F*, costal cartilages: *G*, the humerus: *H*, the head of the humerus, covered by the capsular ligament.

1, the pectoralis minor: this muscle, which is also called the serratus parvus anticus, arises from the external surface of the third, fourth, and fifth ribs, and from the superior border of their cartilages, by broad and thin tendinous slips, 2, 3, 4, which ascend in front of the external intercostal muscles. From these origins, the fibres run upwards and outwards and unite to form a flat tendon which is inserted into the internal edge and apex of the coracoid process; 6, common tendon of the coraco-brachialis and short head of the biceps, arising from the apex of the coracoid process; 7, the serratus magnus; the fifth digitation, 8, of this muscle is closely united at its superior border, with the inferior fasciculus of the pectoralis minor; 9, seventh digitation of the serratus magnus; 10, the subclavius muscle; 11, its insertion, by a strong tendon, into the cartilage of the first rib; 12, the latissimus dorsi; 13, its tendon, which is broad and flat, and turns from below upwards and from behind forwards, on the inferior border of the teres major, and is inserted at 14, into the bottom of the bicipital groove and into the lesser tuberosity of the humerus; 15, fibrous band connecting the tendon of the latissimus dorsi with the brachial aponeurosis; 16, the teres major; 17, the sub-scapularis; 18, the triceps extensor; 19, the long head of the biceps; 20, the first external intercostal muscle; 21—21, the internal intercostal muscles, covered by an aponeurosis; 22, anterior portion of the trapezius; 23, the sterno-cleido-mastoideus, divided about the middle of the neck; 24, the scalenus anticus; 25, the scalenus posticus; 26, the omo-hyoideus; 27, the sterno-hyoideus; 28, the sterno-clavicular articulation; 29, the acromio-clavicular articulation; 30, the coraco-acromic ligament.



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Pl. 33

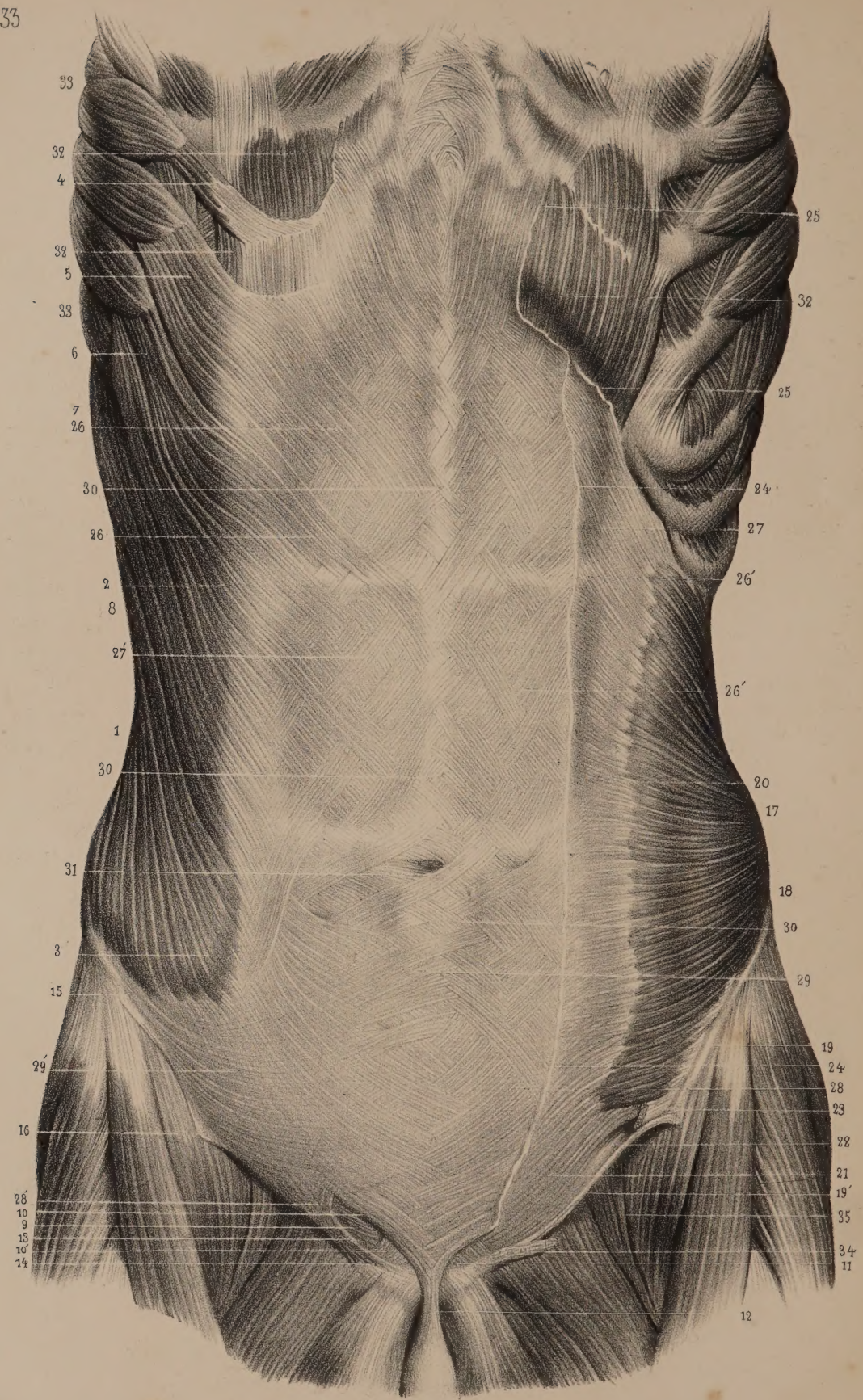

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PLATE XXXIII.

APPARATUS OF LOCOMOTION.—THE MUSCLES.

ANTERIOR ABDOMINAL REGION.

FIRST LAYER.

1, obliquus externus abdominis of the right side. The anterior portion of this muscle, 2—3, arises by digitations from the outer aspects of the fifth, sixth, seventh, eighth and ninth ribs, 4—5—6—7—8, and ends in a broad aponeurosis which forms the superficial layer of the anterior abominal aponeurosis. The fibres of this aponeurosis unite inferiorly into ribbon-like fasciculi, which frequently leave considerable spaces between them. Two of these fasciculi in particular, in the vicinity of the os pubis, enclose an oval-shaped gap, 9, the *external inguinal ring*, which is the external orifice of the *inguinal canal*, and transmits the spermatic vessels in the male, the round ligament of the uterus in the female. The two fasciculi which form this ring are entitled *pillars*, and are spoken of as *internal or superior*, and *external or inferior*, pillars. The internal pillar, 10—10,' of considerable breadth, decussates with that of the opposite side, and is inserted, 11, into the spine and crest of the pubis, and into the broad surface which bounds the sub-pubic or obturator foramen internally The two pillars interlacing, form a fibrous expansion, 12, which descends towards the penis. The external pillar, 13, of much less breadth than the internal pillar, is inserted, 14, into the spine and in front of the symphysis of the pubis; some of its fibres may be followed to the os pubis of the opposite side. This external pillar of the inguinal ring forms part of the *femoral arch*, or *ligament of Poupart* or of Fallopius, a strong fibrous band extending from the symphysis pubis to the anterior and superior spinous process of the ilium, 15, uniting intimately with the femoral aponeurosis or fascia. 16—17, obliquus internus abdominis of the left side. The anterior portion of this muscle arises from the anterior extremity of the crista ilii, from the anterior superior spine of the same bone, 18, and from Poupart's ligament, 19—19'; from thence the fleshy fibres proceed radiating upwards to terminate in an aponeurosis, 20, which forms the middle layer of the anterior abdominal aponeurosis. The most inferior of the fleshy fibres, slender and pale, arise from the spine of the os pubis and superior part of the symphysis, where they blend with the inferior portion of the aponeurosis of the external oblique; at the level of the inguinal canal, 22, these fibres describe a curve having the concavity posteriorly, which embraces the spermatic vessels; 23, origin of the cremaster muscle; 23', external pillar of the left inguinal ring, divided; 24—24', aponeurosis of the internal oblique of the left side which unites by its upper part with the fibrous expansion, 25—25, furnished by the inferior fasciculus of the pectoralis major. The anterior abdominal aponeurosis thus supplied by the aponeuroses of the two oblique muscles and by that of the transversalis (See PLATE XXXIV.) presents eminences and depressions in relation with the fleshy bellies and tendinous intersections of the rectus abdominis, which it incloses in a kind of sheath. The fibres which compose it, interwoven in every direction, give it the appearance of a complex artificial texture. In pursuing the dissection, the fibres oblique from above downwards and from right to left, 26—26, are seen continuous on the one hand with the fleshy fibres of the right external oblique, and on the other, 26'—26', with the fleshy fibres of the left internal oblique; the fibres oblique from above downwards and from left to right, 27, again, are continuous on the one hand with the fleshy fibres of the left external oblique, and on the other, 27', with the fleshy fibres of the right internal oblique. From this it follows that the four oblique muscles together—the external oblique of the one side with the internal oblique of the opposite side—from two digastric muscles, the intermediate aponeuroses of which interlace through the entire extent of the supra-umbilical portion of the abdomen. This disposition, which is distinctly pointed out by Santorini and Winslow, is only applicable to a portion of these muscles: below the umbilicus the fleshy fibres of the internal obliques, having become nearly horizontal in their course, unite by means of their aponeuroses; the aponeurotic fibres of the external obliques interlace and decussate; those of the left side, 28—29, pass to the right and form the arched fibres which we observe in the neighbourhood of Poupart's ligament. Among these fibres some, 28', course around the upper edge of the ring and the outer pillar, to be inserted into the spine and crest of the ilium. The two transversales muscles (See PLATE XXXIV.) uniting by means of their aponeuroses form a third digastric muscle, which envelopes the whole abdomen like a broad girdle. 30—30, linea alba, which diminishes in breadth and distinctness from above downwards, and finally ceases entirely; 31, umbilicus; 32—32, superior extremity of the rectus abdominis; 33—33, digitations of the serratus magnus; 34, external pillar of the inguinal ring of the right side cut through; 35, psoas and iliacus internus muscles.

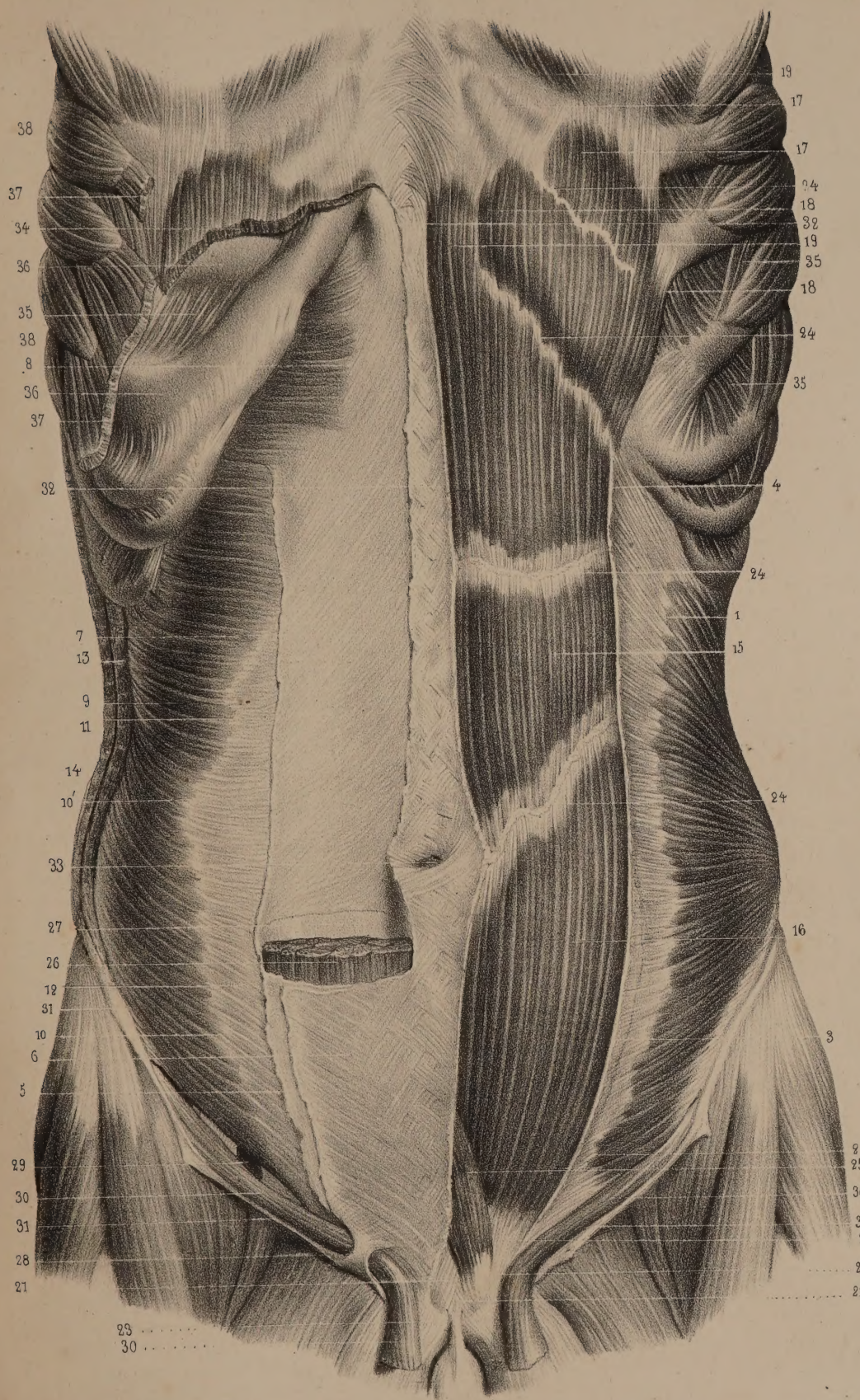
PLATE XXXIV.

APPARATUS OF LOCOMOTION.—THE MUSCLES.

ANTERIOR ABDOMINAL REGION.

SECOND LAYER.

1—2, obliquus internus abdominis, the aponeurosis of which, 3—4, divides into two laminæ opposite to the outer edge of the rectus abdominis: the superficial lamina, 5, passes in front of the rectus, and blends towards the inner edge of the muscle with, 6, the aponeurosis of the external oblique; the deep layer, 7, passes behind the rectus. This posterior layer is in relation with no more than the three superior quarters of the rectus; the anterior layer is in relation with it through its entire length. 8—9—10, transversalis abdominis, which arises from the lumbar vertebræ, from the internal aspect of the lower ribs and from the crista ilii, and terminates in an aponeurotic tendinous expansion, 10', which divides into two portions opposite the outer edge of the rectus. The superior of these, 11, unites with the deep layer of the aponeurosis of the internal oblique, and with it invests the three upper fourths of the posterior aspect of the rectus; the inferior portion, 12, again passes in front of the rectus, uniting with the superficial lamina of the aponeurosis of the internal oblique. 13, internal oblique cut through; 14, external oblique; 15—16, rectus abdominis, inserted superiorly into the cartilages of the fifth rib, 17, of the sixth rib, 18—18, into the base of the sternum, 19—19, and into the ensiform cartilage, by means of tendinous fibres which interlace with those of the muscle of the opposite side. Inferiorly the rectus is inserted at, 20, into the spine and superior part of the symphysis pubis, the tendinous fibres of implantation interlacing here as they do above with those of the opposite side, 22, a certain number of them descending to form the suspensory ligament of the penis, 23. The fleshy fibres of the rectus are intersected by aponeurotic portions, 24—24, which divide the muscle into several portions. These intersections, always more numerous above than below the umbilicus, rarely extend through the entire thickness or breadth of the muscle. They are always much more distinct anteriorly than posteriorly, and adhere intimately with the anterior part of the sheath which encloses the rectus. 25, pyramidalis, arising tendinous from the superior part of the symphysis pubis, 25', the fleshy fibres mount obliquely from below upwards and terminate in a pointed extremity in the abdominal aponeurosis. 26, rectus, divided a little below the umbilicus, in order to show at once the anterior and the posterior portion of its sheath, the former existing over the whole length of the muscle being formed in its three superior fourths by the aponeuroses of the external and internal obliques, and in its inferior fourth by those of the two obliques and transversalis. The posterior portion of this sheath only exists in the three superior fourths; it is formed by the aponeurosis of the internal oblique and transversalis. Through the rest of its extent the rectus is only separated from the peritoneum by the fascia transversalis, 27. 28, external inguinal ring; 29, internal inguinal ring, between which extends the inguinal canal; 30—30, cremaster; 31, Poupart's ligament; 32—32, linea alba; 33, umbilical ring; 34, upper extremity of the rectus; 35—35, intercostals; 36—36, costal cartilages; 37—37, digitations of the external oblique muscle; 38—38, digitations of the serratus magnus.



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Pl 35.

Fig. 1.

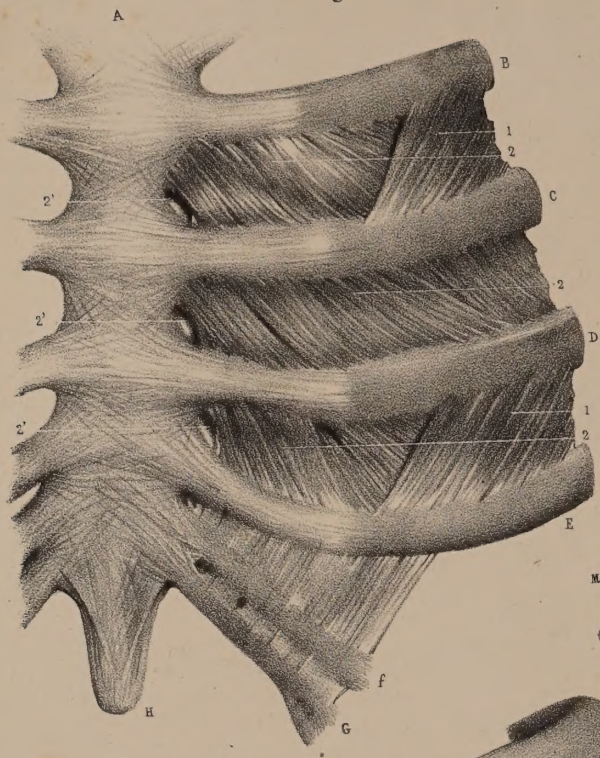

Fig. 4.

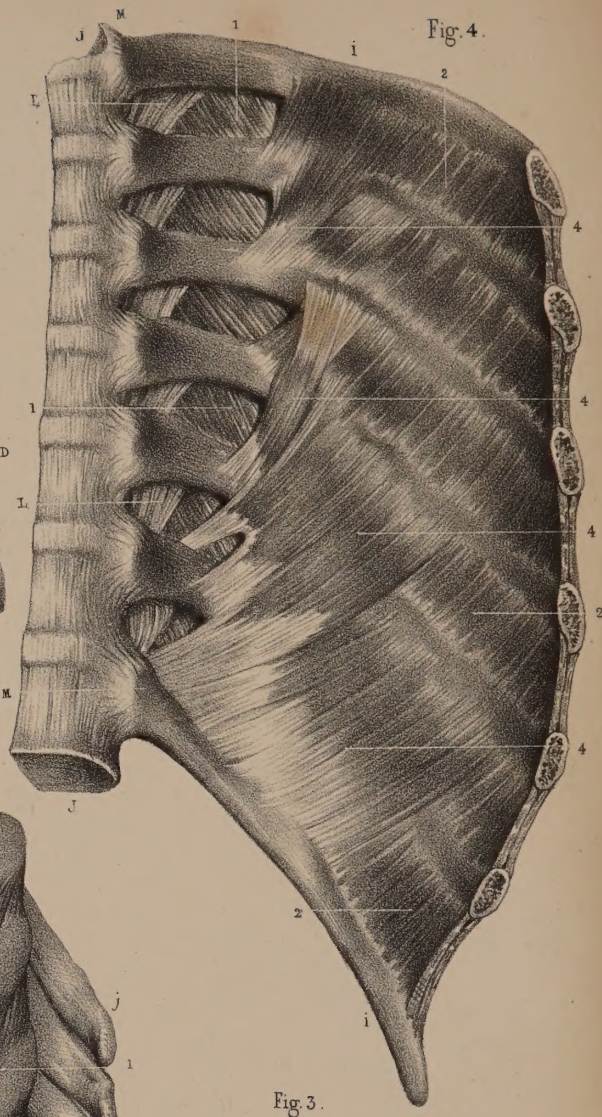

Fig. 2.

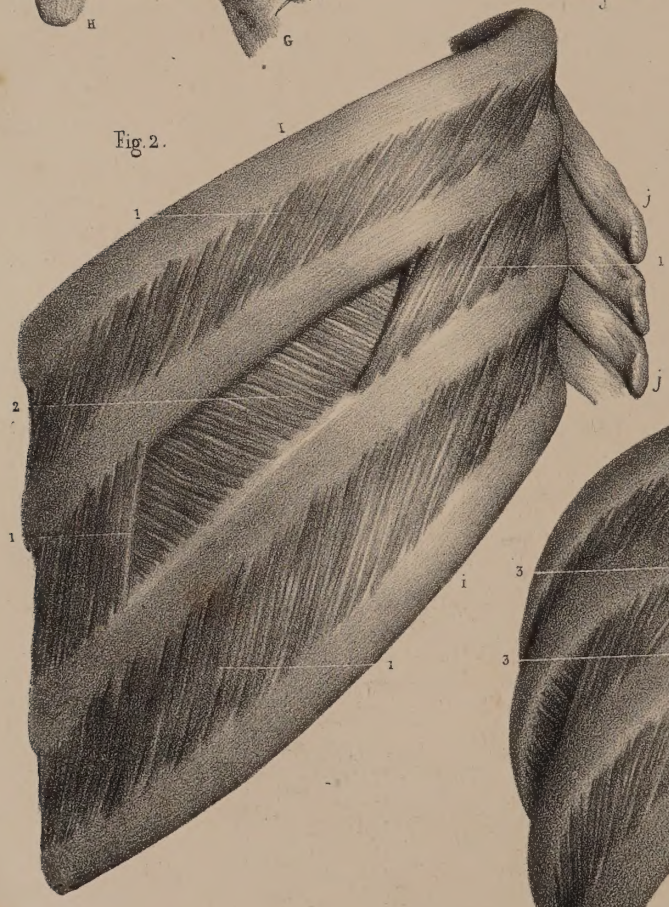

Fig. 3.

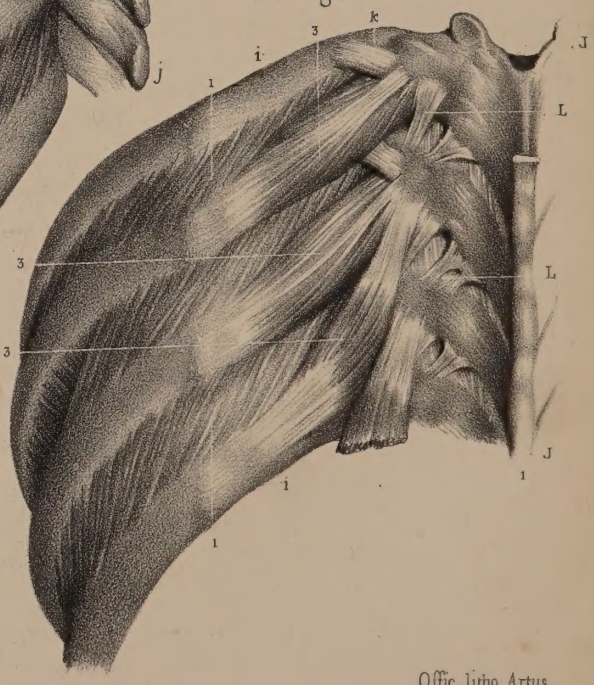

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PLATE XXXV.

APPARATUS OF LOCOMOTION—THE MUSCLES.

INTERCOSTAL REGION.

Fig. 1, *A*, sternum; *B*, *C*, *D*, *E*, anterior portions of the second, third, fourth, and fifth ribs; *F*, *G*, cartilages of the sixth and seventh ribs; *H*, appendix xiphoides.

Figs. 2, 3, 4, *I I*, ribs; *J J*, vertebral column.

Fig. 3, *K*, anterior costo-vertebral ligament.

Figs. 3 and 4, *L L*, superior transverso-costal ligament.

Fig. 4, *M*, Posterior extremity of the ribs.

Figs. 1, 2, 3, 4, 1—1—1, external intercostal muscles. They are eleven in number, and extend from the spinal column 1, fig. 4, to the union of the ribs with their cartilages, 1, fig. 1. Their fibres, directed obliquely forwards and inwards, are attached to the outer and lower lip of the rib above, and to the outer and upper edge of the rib below.

Figs. 1, 2, 3, 4, 2—2—2, internal intercostals, extending from the sternum, 1, fig. 1, to the angles of the ribs, 2, fig. 4. Their fibres proceed obliquely backwards and outwards, and, arising from the inner lip of the upper edge of the rib below, are inserted into the inner lip of the lower edge of the rib above; 2'—2'—2, holes for the transmission of vessels.

Fig. 3, 3—3—3, supra costales; twelve in number. They arise severally from the transverse processes of the vertebræ placed above, and are inserted into the posterior part of the superior edge of the outer aspect of the ribs below. They increase in size as they descend; the last pair are very fleshy.

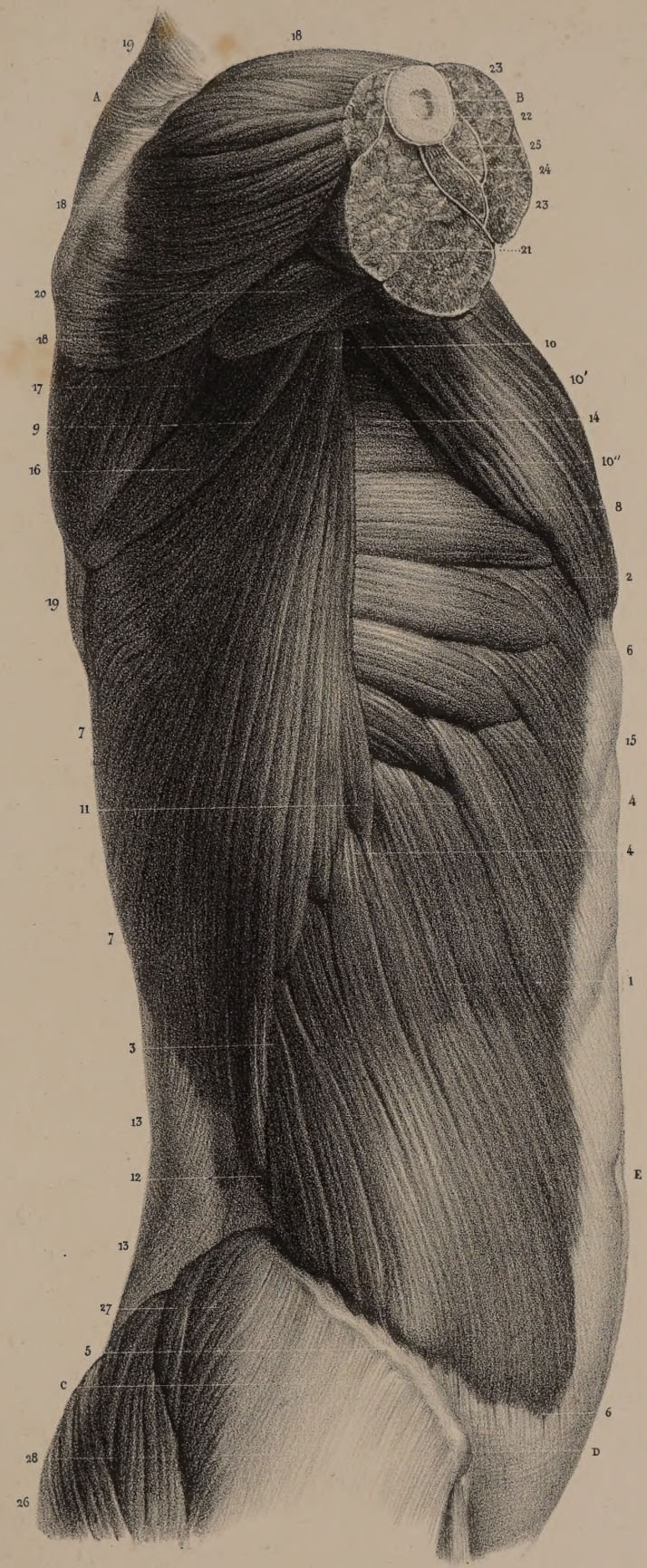
PLATE XXXVI.

APPARATUS OF LOCOMOTION—THE MUSCLES.

LATERAL REGION OF THE TRUNK.

A, outer end of the clavicle; *B*, humerus; *C*, crista ilii; *D*, anterior superior spinous process; *E*, umbilicus.

1, obliquus abdominis externus, arising by digitations, 2—3—4—4, from the outer surface of the seven lowest ribs, the five superior digitations interlocking with corresponding tongues of the serratus magnus, and the three lower slips with others of the latissimus dorsi. The fibres run, in different degrees, obliquely downwards and forwards, the posterior fasciculi proceeding almost perpendicularly downwards. These posterior portions end tendinous, and are inserted along the three anterior fourths of the outer lip of the crista ilii, 5; the anterior and middle fibres end in a broad aponeurosis, 6—6, which constitutes the superficial layer of the abdominal aponeurosis, and is inserted into the anterior superior spinous process of the ilium, the spine of the pubis, the pectineal line, anterior aspect of the pubis and linea alba. 7—7, latissimus dorsi; 8, its anterior edge; 9, its superior edge; 10, its superior extremity; 11, its origins from the three inferior ribs; 12, its origin from the posterior third of the crista ilii; 13—13, its broad tendinous or aponeuretic expansion, by which it arises from the spinous processes of the lumbar vertebræ; 10', pectoralis major; 10", lower edge of the pectoralis minor; 14—15, serratus magnus; 16, teres major; 17, infraspinatus and teres minor; 18—18, deltoid; 19, trapezius s. cucularis; 20, long head of the biceps extensor cubiti; 21—22—23—24—25, muscles of the arm divided; 26—27, gluteus maximus; 28, aponeurosis covering the gluteus medius.



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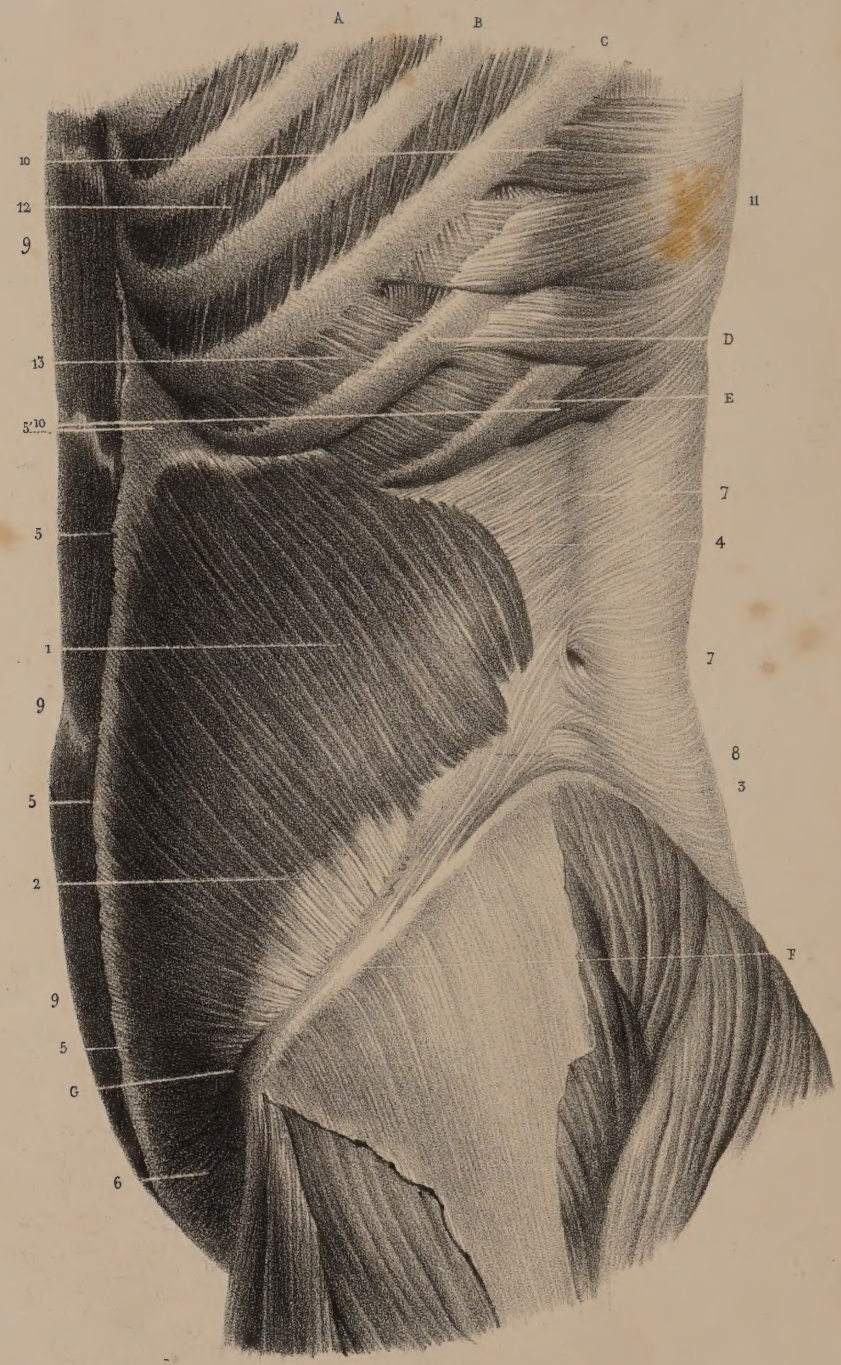

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PLATE XXXVII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ABDOMINAL REGION.

SECOND LAYER.

A, *B*, *C*, *D*, *E*, the five inferior ribs; *F*, crista ilii; *G*, anterior and superior spinous process of the ilium.

1, obliquus internus muscle, attached by tendinous fibres to, 2, the three anterior fourths of the crista ilii, to the anterior and superior spinous process of the ilium, to Poupart's ligament and to the spinous processes of the lumbar and sacral vertebræ, by an aponeurosis, 3, which aids in forming the posterior abdominal fascia. From these numerous origins the fleshy fibres proceed with different obliquities upwards and inwards: those which come from the spinous processes, 4, are nearly vertical, and are inserted tendinous, into the last rib; the fibres proceeding from the crest of the ilium, which are more oblique as they arise more posteriorly, are inserted partly into the anterior abdominal aponeurosis, 5, 5, and partly into the cartilages of the 9th, 10th and 11th ribs, blending with the internal intercostals. The fibres which take their rise from the anterior superior spine of the ilium run horizontally to end in the aponeurosis extended over the front of the abdomen; and those that arise from Poupart's ligament, 6, descend from without inwards and are inserted into the spine and symphisis of the os pubis, where they unite with the aponeurosis of the external oblique. 7, 7, superior layer of the posterior aponeurosis of the transversalis, which runs to be inserted into the spinous processes of the lumbar vertebræ. 8, fibrous bundle which arises from the crest of the ilium and is inserted into the posterior abdominal aponeurosis. 9, 9, 9, rectus abdominis. 10, serratus postius inferior, arising by digitations from the lower margin of the four last ribs, and ending in an aponeurosis, 11, which unites intimately with that of the latissimus dorsi, and is inserted into the spinous processes of the three last dorsal vertebræ and the three first lumbar vertebræ. 12, external intercostal muscles. 13, internal intercostal muscles.

PLATE XXXVIII.

APPARATUS OF LOCOMOTION—THE MUSCULAR SYSTEM.

ABDOMINAL REGION.

Fig. 1, *A*—*B*, the four lowest ribs; *C*, crest of the ilium; *D*, anterior and superior spinous process of the ilium.

1, 2, 3, transversalis abdominis, arising from the three anterior fourths of the inner lip of the crista ilii by short tendinous fibres; from the inner aspect of the six lowest ribs by digitations which interlock with those of the diaphragm; from the lumbar vertebræ by an aponeurosis, 4, the superficial lamina of which (see Plate XXXVII.) is attached to the spinous processes, and the middle lamina to the transverse processes of the vertebræ. 6, fibrous bundle arising from the crest of the ilium and uniting with the aponeurosis of the transversalis. From these various attachments the fleshy parallel and horizontal fibres of the transversalis end tendinous in an aponeurotic sheet which assists in forming the anterior abdominal aponeurosis. 8, 9, posterior wall of the sheath of the rectus. 10—11, anterior wall of the same; 12 rectus muscle; 13—14, external intercostals.

LUMBAR REGION.

Fig. 2, *a*, twelfth rib; *b*, *c*, *d*, *e*, transverse processes of the four first lumbar vertebræ; *f*, *g*, sacro-lumbar spinous ridge; *h*, crest of the ilium.

1, 2, 3, 4, 5, quadratus lumborum, arising by digitations from the inferior edge of the 12th rib and from the transverse processes of the four first lumbar vertebræ, this muscle is inserted into the ilio-lumbar ligament and the posterior part of the crista ilii. 5—6, intertransversales lumborum; 7, ilio-lumbar ligament; 8, posterior sacro-iliac ligament.

Fig.1.

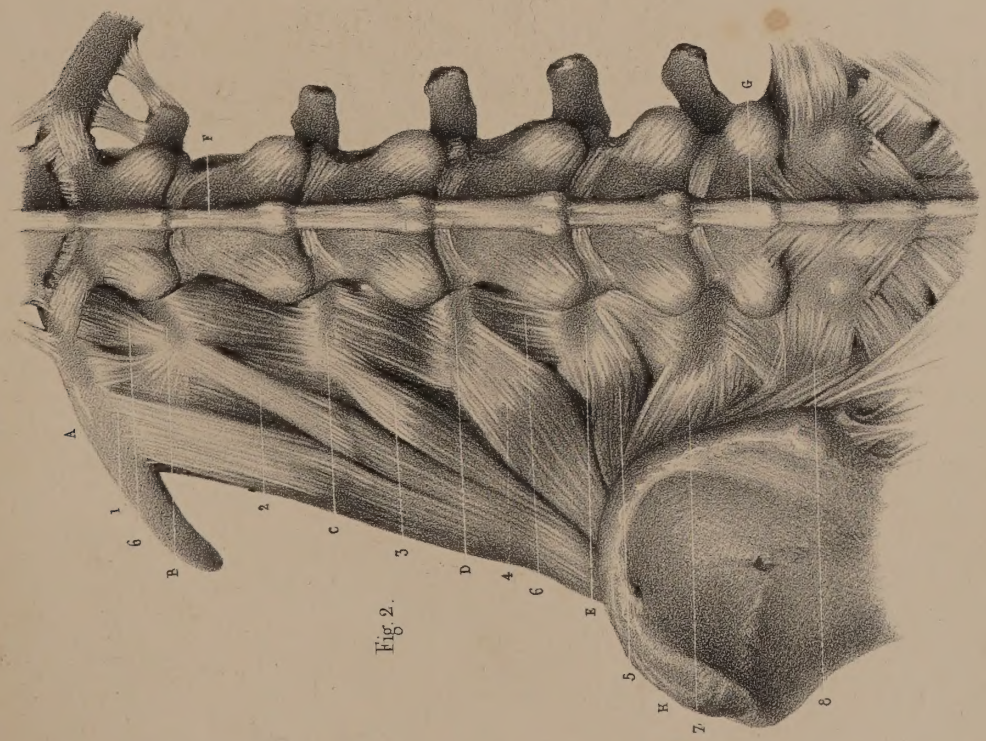

Fig.2.

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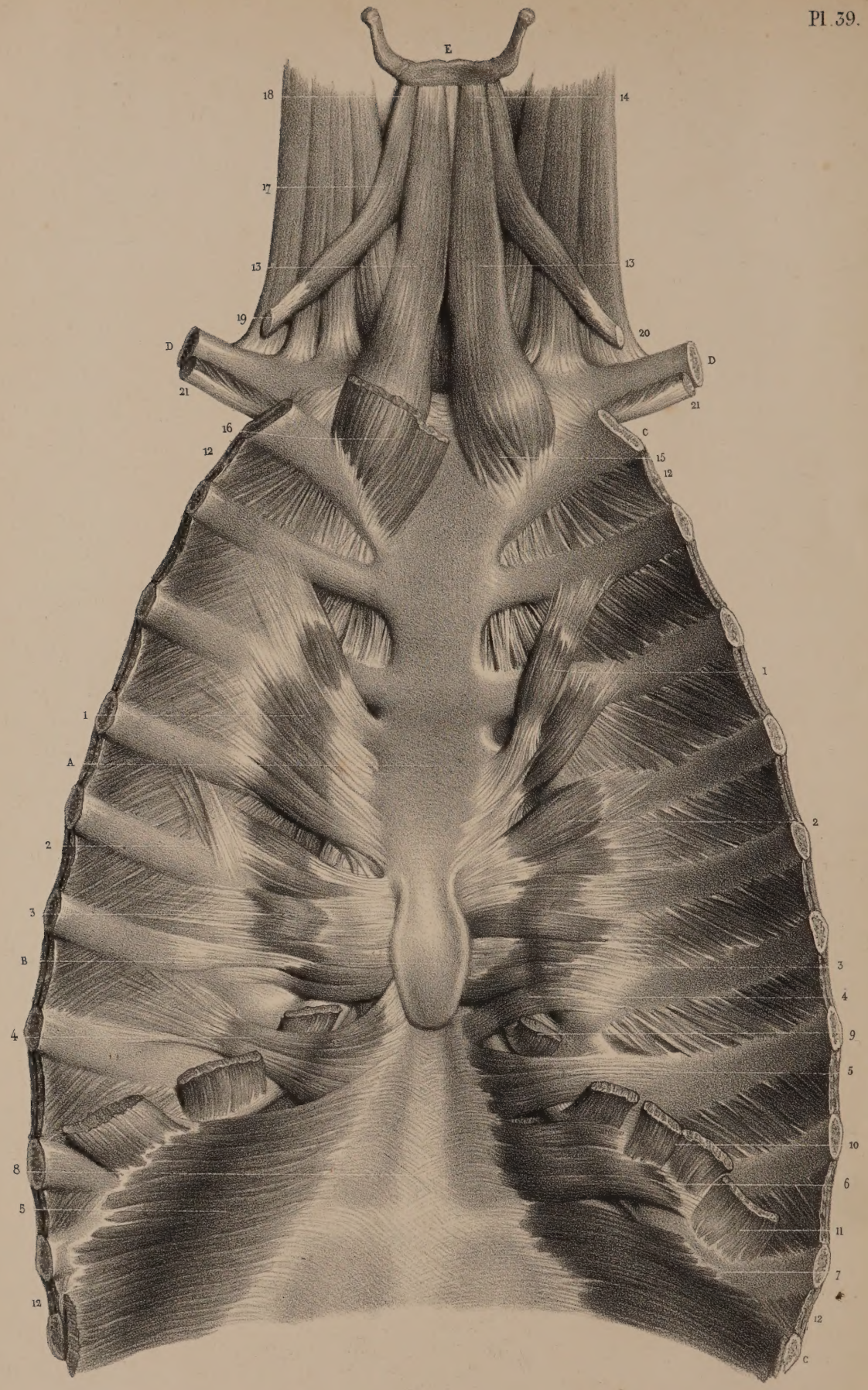

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PLATE XXXIX.

APPARATUS OF LOCOMOTION—THE MUSCLES.

TEMPORO-MAXILLARY REGION.

Figs. 1 and 2, *A*, body of the lower jaw-bone; *B*, ramus of the same; *C*, angle of the same. 1—1'—1'', Masseter muscle. It is made up of three portions: the external portion, 1, fig. 1, which is the largest, arises at, 2, from the two anterior thirds of the outer edge of the inferior margin of the zygomatic arch, by a powerful tendon, which extends into the substance of the muscle. The fleshy fibres proceeding from the deep aspect of this tendon descend obliquely from before backwards, to be inserted into the outer aspect of the angle and ramus of the inferior maxillary bone. The middle portion of the masseter, 1'—1'', fig. 1, arises from the two posterior thirds of the outer lip of the inferior edge of the zygomatic arch, and descends obliquely from before backwards, crossing the course of the external portion of the muscle, to be inserted into the inferior edge of the lower jaw, in front of the angle. The internal portion, 1'', fig. 2, arises fleshy from the inner lip of the lower edge of the zygoma in its whole extent, and its fibres run vertically downwards to end tendinous, and be inserted, 3, into the outer aspect of the angle of the jaw.

Fig. 3, *A*, ramus, and *B*, coronoid process of the lower jaw. 1, Temporalis muscle, which arises from the entire extent of the temporal fossa, 2—3—4, and from the internal aspect of an aponeurosis, which is connected with the superior edge of the zygomatic arch. The fleshy fibres from this double origin radiate, converging inferiorly, the anterior obliquely from before backwards, the middle vertically, the posterior from behind forwards: they all end in a common tendon of great strength, 5, which is imbedded, as it were, in the thickness of the muscle at first; but emerging from under the zygoma, it is somewhat folded on itself, and embracing is finally inserted into the summit of the coronoid process. 6, section of the fleshy fasciculus, which takes its rise from the superficial temporal fascia. 6', the anterior portion of the muscle, which is constituted by a very thick fleshy bundle.

Fig. 4, *A*, *B*, vertical section of the base of the skull, on the level of the middle fossa. *C*, *D*, condyles of the jaw. *E*, zygomatic arch. *F*, pterygoid fossa. *G*, posterior aspect of the lower jaw-bone. *H*, body of the os hyoides. *I I*, great cornua; and *J J*, little cornua of the os hyoides.

1, pterygoideus internus muscle, arising at, 2, from the pterygoid fossa, the hook-like process of the internal wing of the pterygoid process, and from the tuberosity of the palatine bone, by means of tendinous laminæ, which extend into the thickness of the muscle. The fleshy fibres descend obliquely from before backwards, and from within outwards, and proceed to be inserted tendinous into the internal aspect of the angle of the lower jaw. 4, pterygoideus externus, arising from the external aspect of the pterygoid process, the tuberosity of the os palati and the ridge which divides the zygomatic from the temporal fossa, and inserted, the fleshy fibres of the muscle running horizontally from before backwards, into the pit which is situated in front of the neck of the condyle of the lower jaw, and into the interarticular cartilage of the articulation. 5, masseter muscle. 6—6', mylo-hyoides, seen from behind. It is attached at the one end to the internal maxillary line, 7—7, and at the other to the body of the os hyoides. 8, genio-hyoideus, arising from the lower tubercle of the apophysis menti: it proceeds backwards, and is inserted into the body of the os hyoides. 9, attachment of the genio-glossus to the superior tubercle of the apophysis menti.

PLATE XL.

APPARATUS OF LOCOMOTION—THE MUSCLES.

INTERCOSTAL REGION.

A, posterior aspect of the sternum; *B*, ensiform process; *C C*, ribs; *D D*, clavicles; *E*, os hyoides.

1—2—3, triangularis sterni. This muscle is connected by tendinous fibres to the posterior part of the edges of the ensiform cartilage, and to the second piece of the sternum. The fleshy fibres are divided into several distinct fasciculi, which are inserted by their tendinous expansions into the internal aspect and edges of the cartilages belonging to the second, third, fourth, fifth, and sixth ribs. The superior fasciculi run from above downwards, and from within outwards; the middle fasciculi from below upwards, and from within outwards; the inferior fasciculi, of much larger size, run in a direction parallel to the fibres of the transversalis abdominis muscle, with which, in fact, they blend. 4—5—6—7, fasciculi of the transversalis; 8, fascia of the transversalis; 9—10—11, digitations of the diaphragm; 12—12', internal intercostal muscles; 13, sterno-hyoideus; inserted into the inferior edge of the body of the os hyoides, 14, it runs downwards and outwards, to be inserted into, 15, the posterior part of the internal extremity of the clavicle, and interarticular cartilage sometimes to the sternum and posterior aspect of the cartilage of the first rib; 16, attachment of the sterno-thyroideus to the posterior aspect of the sternum and cartilage of the first rib; 17—18—19, omo-hyoideus, divided at its aponeurotic intersection; 20, sterno-mastoideus; 21, subclavius.

Pl.40.

Fig. 3.

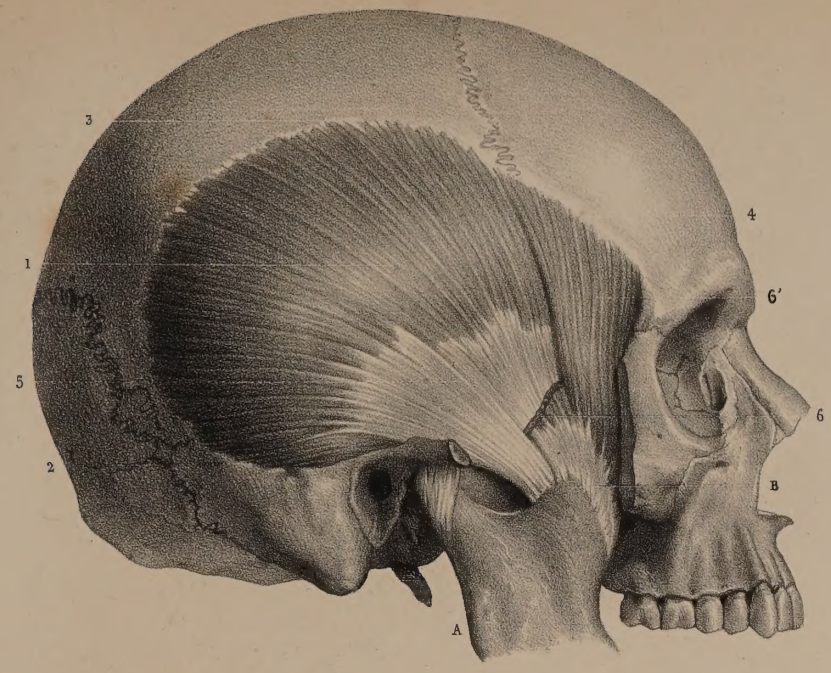
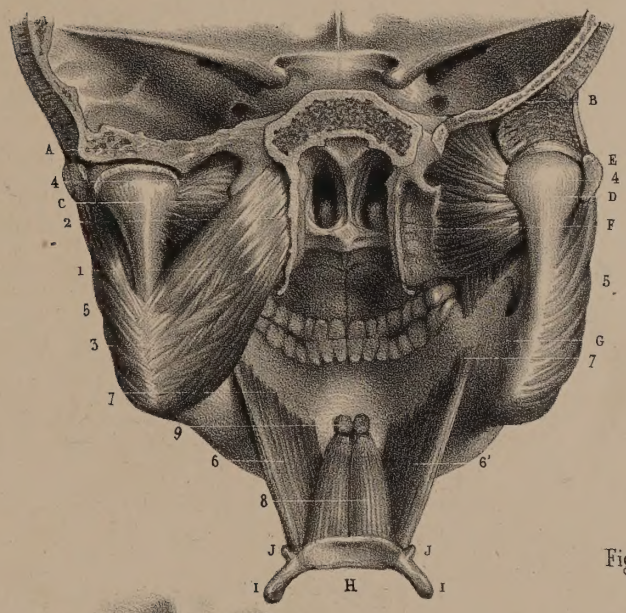


Fig. 4.



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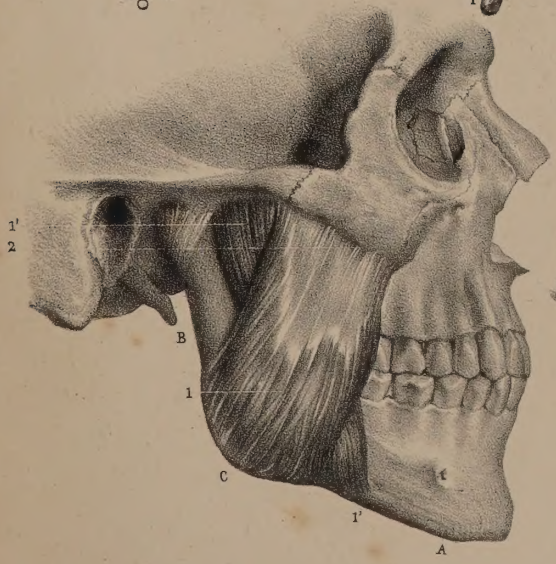
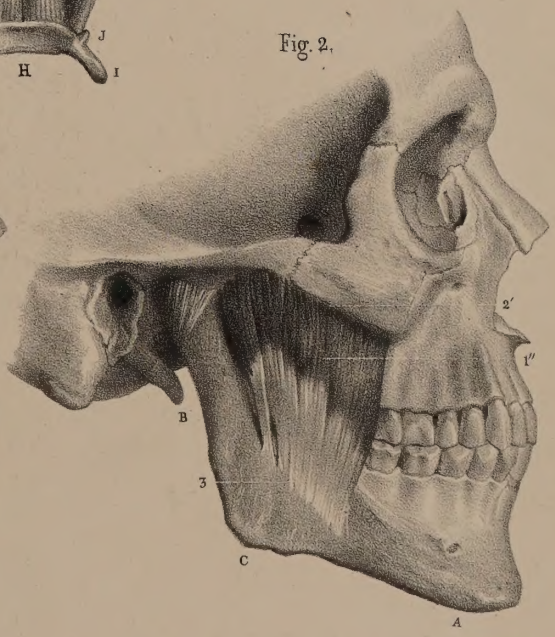


Fig. 2.



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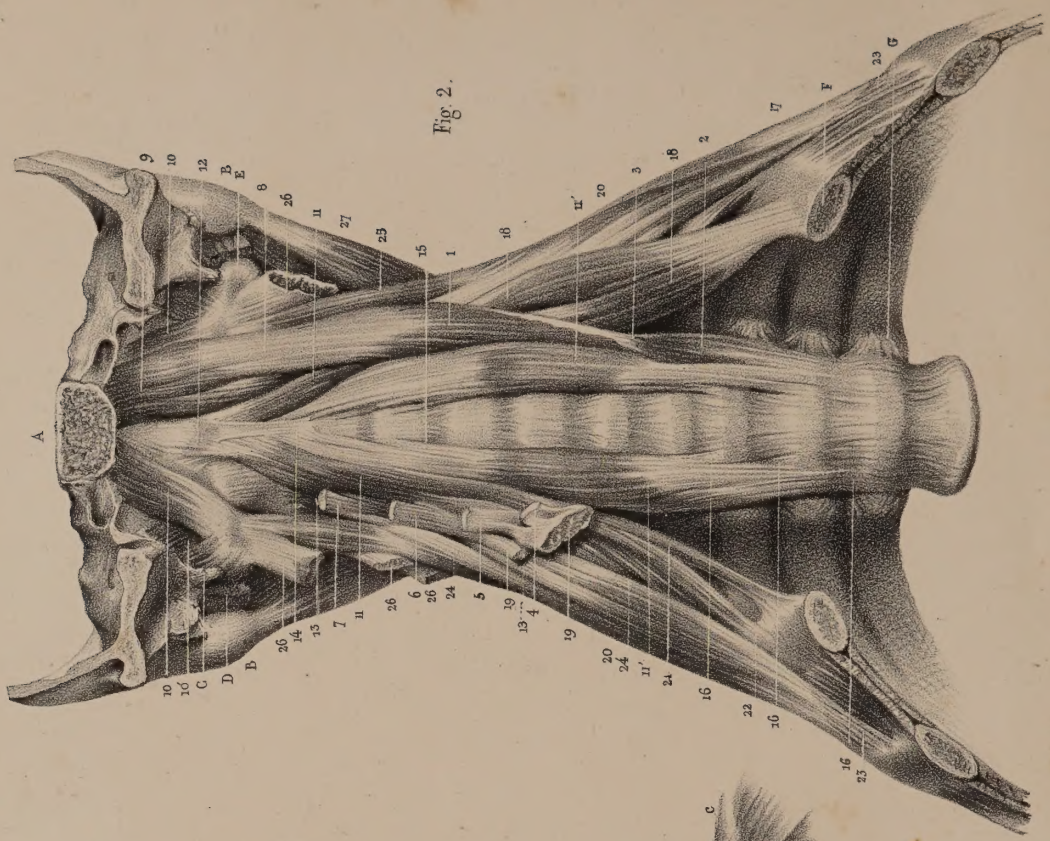

Fig. 2.

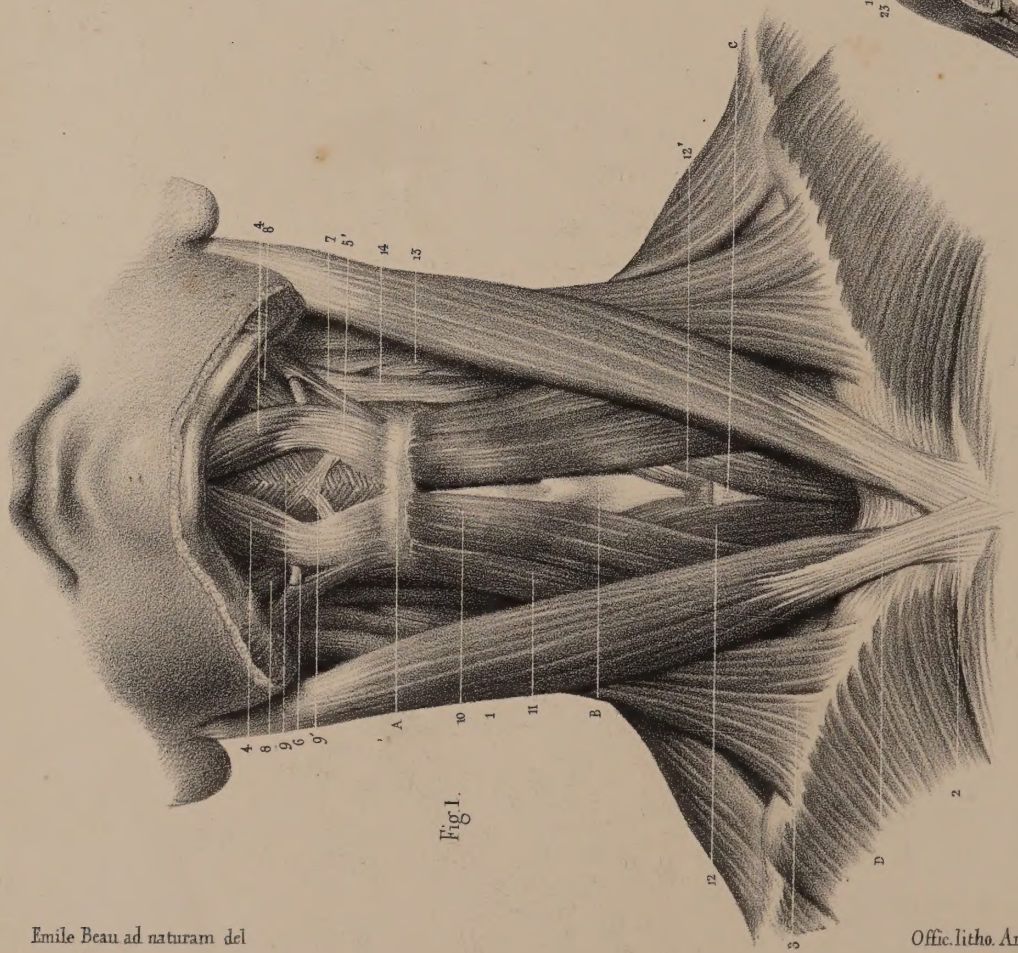

Fig. 1.

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PLATE XLI.

APPARATUS OF LOCOMOTION—MYOLOGY.

ANTERIOR REGION OF THE NECK.

FIRST LAYER.

1, Sterno-cleido-mastoid muscle, divided inferiorly into two parts: the anterior bundle, thick and rounded, arises at, 2, from the anterior and superior part of the sternum, by a very strong tendon, which blends with that of the opposite side; the posterior bundle, large and thin, takes its origin at, 3, to form the posterior margin and superior aspect of the clavicle, inwards towards the sterno-clavicular articulation, and sometimes even from the anterior and superior part of the sternum; 4, anterior belly of the digastricus, which is here double by the addition of a little fleshy bundle, which is inserted directly into, 5, the body of the os hyoides; 6, tendon of the digastricus; 7 stylo-hyoid muscle; 8—8, mylo-hyoid muscle, the fleshy fibres of which terminate in aponeurotic fibres, 9—9, which decussate on the median line,—the two mylo-hyoid muscles, in fact, form but one muscle; 10, the sterno-hyoid muscle; 11, omo-hyoid muscle; 12, sterno-thyroid muscle, some fibres of which lose themselves on the thyroid body; 13, posterior scalenus muscle; 14, rectus capitis anticus major.

PREVERTEBRAL REGION.

Fig. 2, *a*, spheno-basilar process; *b*, mastoid process; *c*, styloid process; *d—e*, transverse processes of the atlas; *f*, anterior extremity of the first rib; *g*, posterior extremity of the third rib.

1, rectus capitis anticus major. This muscle sometimes united to the longus colli muscle, by a small fleshy bundle, 2—3, takes its rise from the anterior tubercles of the transverse processes of the 6th, 5th, 4th and 3rd cervical vertebræ, by the tendons, 4, 5, 6, 7, which mix with those of the scaleni muscles. From these tendons spring the fleshy fibres, which collected at first into distinct bundles, afterwards unite, and terminate on the posterior aspect of an aponeurosis, 8, situated in front of the muscle. From this aponeurosis, a large fleshy bundle proceeds, and is inserted into the spheno-basilar process. The bundle that arises from the third cervical vertebra is inserted immediately into the spheno-basilar process, without being united to the common bundle; 10, rectus capitis anticus minor. This muscle stretches from the spheno-basilar process, to the base of the transverse process and neighbouring part of the lateral mass of the atlas; 10, rectus capitis lateralis, which stretches from the transverse process of the atlas, to the jugular surface of the os occipitis; 11—11', longus colli; this muscle is composed of two parts: the superior, 11, is inserted by aponeurotic fibres into the anterior tubercle of the atlas, 12, having come obliquely from without or from its origin which is by small tendons, 13—13, from the anterior tubercles of the transverse processes of the 6th, 5th, 4th and 3rd cervical vertebræ. The inferior part, 11', proceeds by aponeurotic fibres, 14—15, from the anterior part of the bodies of the second and third cervical vertebræ, and is attached by an aponeurosis, 16, 16, 16, into the anterior surface of the seventh cervical and the three first dorsal vertebræ; a third part having arisen from the anterior tubercles of the transverse processes of the fourth and fifth cervical vertebræ goes to join the inferior part; 18—18, scalenus anticus; 19—19, tendons of this muscle; 20—21, scalenus posticus, composed of two bundles: the anterior arises, 22, from the external surface of the first rib; the posterior, 23, from the superior margin of the second rib; these two bundles uniting, divide into six small fasciculi; 24—24, which are inserted by as many tendons into the posterior tubercles of the transverse processes of the six last cervical vertebræ. The scalenus posticus is often connected by a small distinct slip, 25, with the transverse process of the atlas; 26, 26, 26, tendons of insertion of the triangularis scapulæ; 27, splenius capitis.

PLATE XLII.

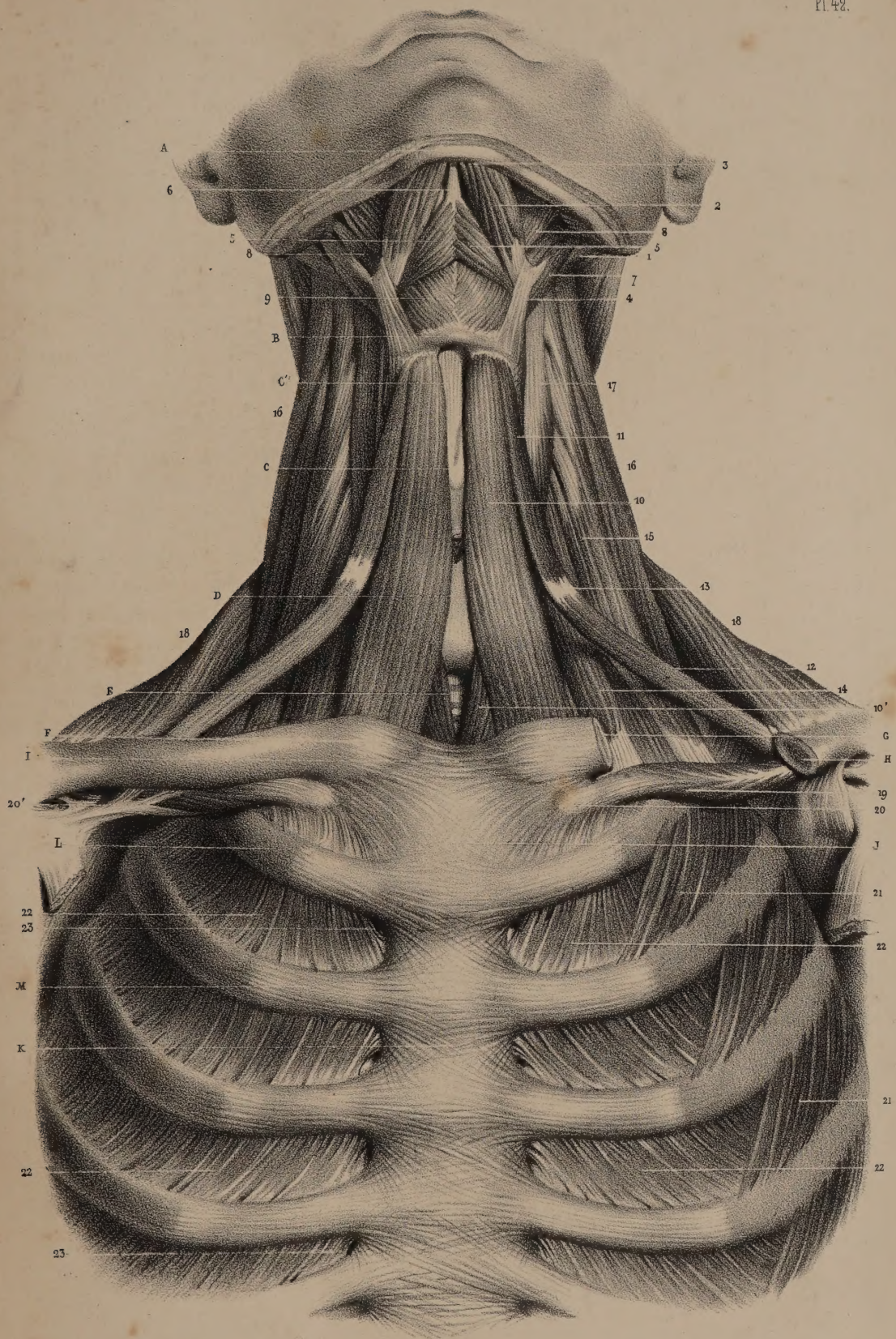
APPARATUS OF LOCOMOTION—MYOLOGY.

ANTERIOR REGION OF THE NECK.

SECOND LAYER.

a, symphysis menti; *b*, os hyoides; *b'*, thyro-hyoid membrane; *c*, thyroid cartilage; *d*, thyroid gland; *e*, trachea; *f*, inner extremity of the right clavicle; *g*—*h*, the left clavicle divided in the middle; *i*, interclavicular ligament; *j*—*k*, sternum; *l*, anterior extremity of the second rib; *m*, cartilage of the third rib.

1—2, the digastric muscle, composed of two fleshy bundles united by a middle tendon; the posterior bundle, 1, arises from the digastric groove of the mastoid process, the anterior bundle, 2, is inserted into the digastric fossa of the posterior surface of the inferior maxillary bone; the middle tendon is connected with the os hyoides by means of a fibrous expansion. Between the anterior bundles of the digastric muscles are often found two small accessory bundles, 5—5, which are inserted by a common tendon, 6, into the back part of the symphysis of the chin; 7, the stylo-hyoid muscle; this muscle is traversed by the tendon of the digastric; it arises from the styloid process, and is inserted into the body of the os hyoides; 8—8, the mylo-hyoid muscle, the posterior fibres of which cross each other or decussate on the median line, and are inserted on the superior part of the body of the os hyoides; 10, the sterno-hyoid; this muscle arises by aponeurotic fibres from the internal extremity of the clavicle, and is inserted into the inferior margin of the os hyoides; 10,' sterno-thyroid muscle; 11, 12, omo-hyoid, this muscle is composed of two fleshy bundles united by a central tendon, 13, the superior bundle, 11, is inserted into the inferior margin of the body of the os hyoides, on the outside of the sterno thyroid with which the insertions are often mixed; the inferior bundle, 12, arises from the superior margin of the shoulder blade, at the back of the coracoid notch; 14, scalenus anticus muscle; 15, scalenus posticus muscle; 16, angular muscle of the shoulder blade; 17, the rectus capitis anticus major; 18, trapezius muscle; 19, the subclavius; this muscle arises by a very strong tendon, 20, from the cartilage of the first rib; from whence it goes obliquely outwards and backwards, to be inserted into the external and inferior part of the clavicle by aponeurotic fibres, 20, which extend in some subjects nearly to the coracoid process; 21—21, external intercostal muscles; 22, 22, internal intercostal muscles; 23, foramina that transmit vessels.



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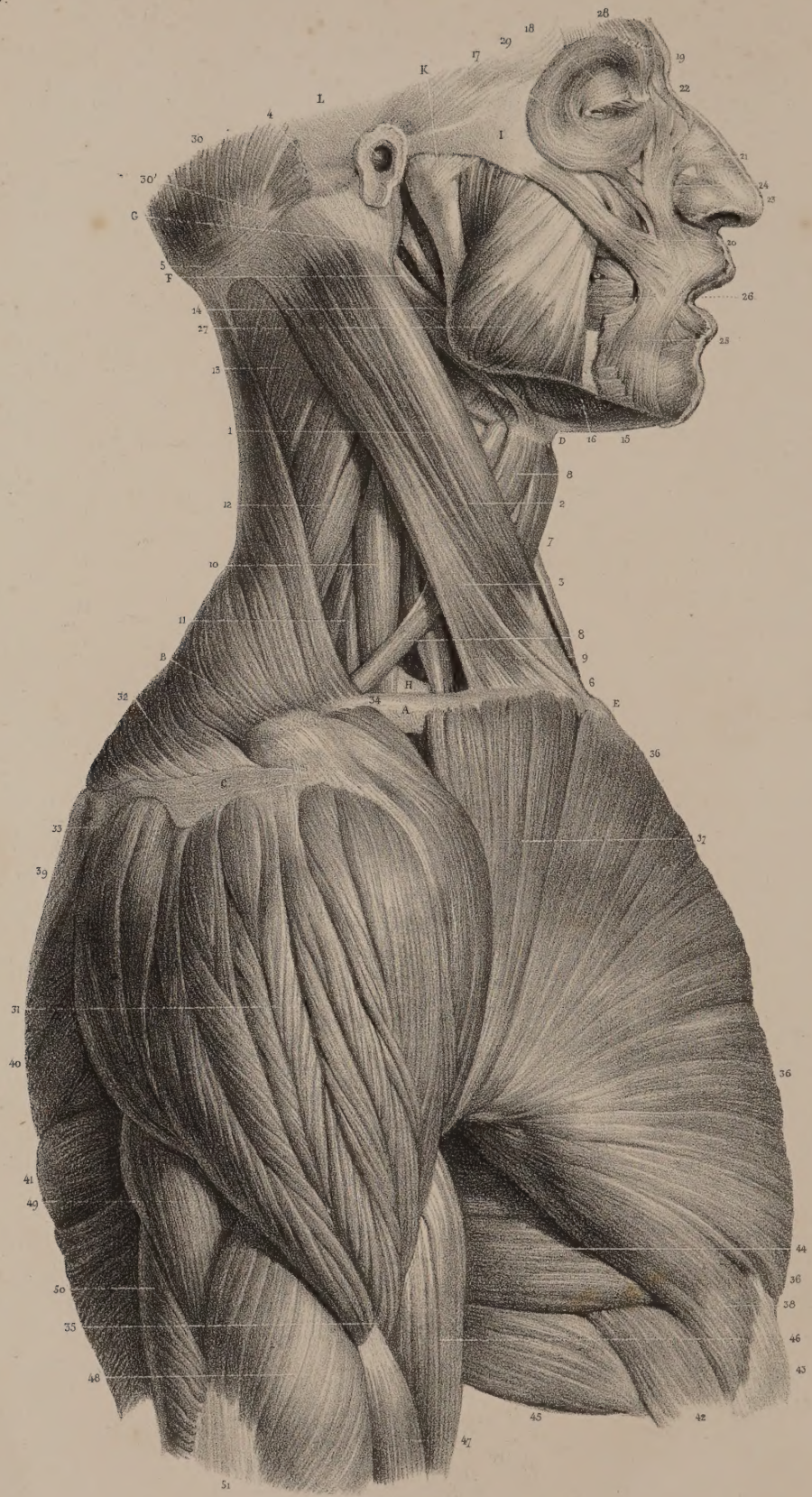

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PLATE XLIII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

LATERAL REGION OF THE TRUNK.

SUPERFICIAL LAYER, *b*.

A, clavicle: *B*, acromion process: *C*, spine of the scapula· *E*, sternum: *F*, ascending ramus of the inferior maxillary bone: *G*, styloid process: *H*, external surface of the first rib: *I*, malar bone: *K*, articulation of the inferior maxillary with the temporal bone: *L*, meatus auditorius externus.

1, sterno-cleido-mastoideus, divided inferiorly, into two portions; 2, the anterior or sternal portion, which is thick and round, and is inserted into the anterior and superior part of the sternum by a tendon which decussates with that of the opposite side; 3, the posterior or clavicular portion, which is broad and thin, and is inserted by tendinous fibres, into the posterior border and superior surface of the clavicle, into the sterno-clavicular articulation, and sometimes into the anterior part of the sternum. These two portions, which are separated inferiorly by an interval of cellular tissue, are united about the middle of the neck, where the clavicular portion is situated behind the sternal portion, and is completely covered by it; 4—5, origins of the sterno-cleido-mastoideus; 4, its origin from the anterior border and the external surface of the mastoid process; 5, from the two external thirds of the superior curved line of the occipital bone, by an aponeurosis which is prolonged backwards as far as the insertions of the trapezius; 6, the sterno-cleido-mastoideus of the opposite side; 7, the sterno-hyoideus; 8—8, the omo-hyoideus; 9, the scalenus anticus; 10—11, the scalenus posticus, divided into two portions; 12, the levator anguli scapulæ; 13, the splenius; 14—15, the digastricus; 16, the mylo-hyoideus; 17—18—19, the orbicularis palpebrarum; 20, the zygomaticus major; 21, the levator labii superioris alæque nasi; 22, the pyramidalis nasi; 23, the levator labii superioris proprius; 24, the levator anguli oris, or musculus caninus; 25, the depressor anguli oris, or triangularis oris; 26, the buccinator; 27, the masseter; 28, the frontal portion of the occipito-frontalis; 29, the musculus anterior auris or attrahens aurem; 30, the occipital portion of the occipito-frontalis; 30', the posterior auris, or retrahens aurem; 31, the deltoid: this muscle is composed of eighteen or twenty fleshy fasciculi, which are united together by slips of fasciæ to form several penniform muscles; 32, 33, 34, origins of the deltoid from the external third of the anterior border of the clavicle, from the posterior edge of the spine of the scapula, and from the inferior border of the acromion: the two latter origins are by tendinous slips which extend very far into the substance of the muscle and form septa within its substance; 35, insertion of the deltoid, by a strong tendon, into the humerus; 36—36, superior portion of the pectoralis major; 37, middle portion; 38, inferior portion; 39—40, inferior portion of the trapezius; 41, the latissimus dorsi; 42, digitation of the obliquus externus; 43, common fascia of the abdomen; 44—45, digitations of the serratus magnus anticus; 46, the biceps flexor cubiti; 47, the brachialis anticus; 48---49---50---51, the triceps extensor cubiti.

PLATE XLIV.

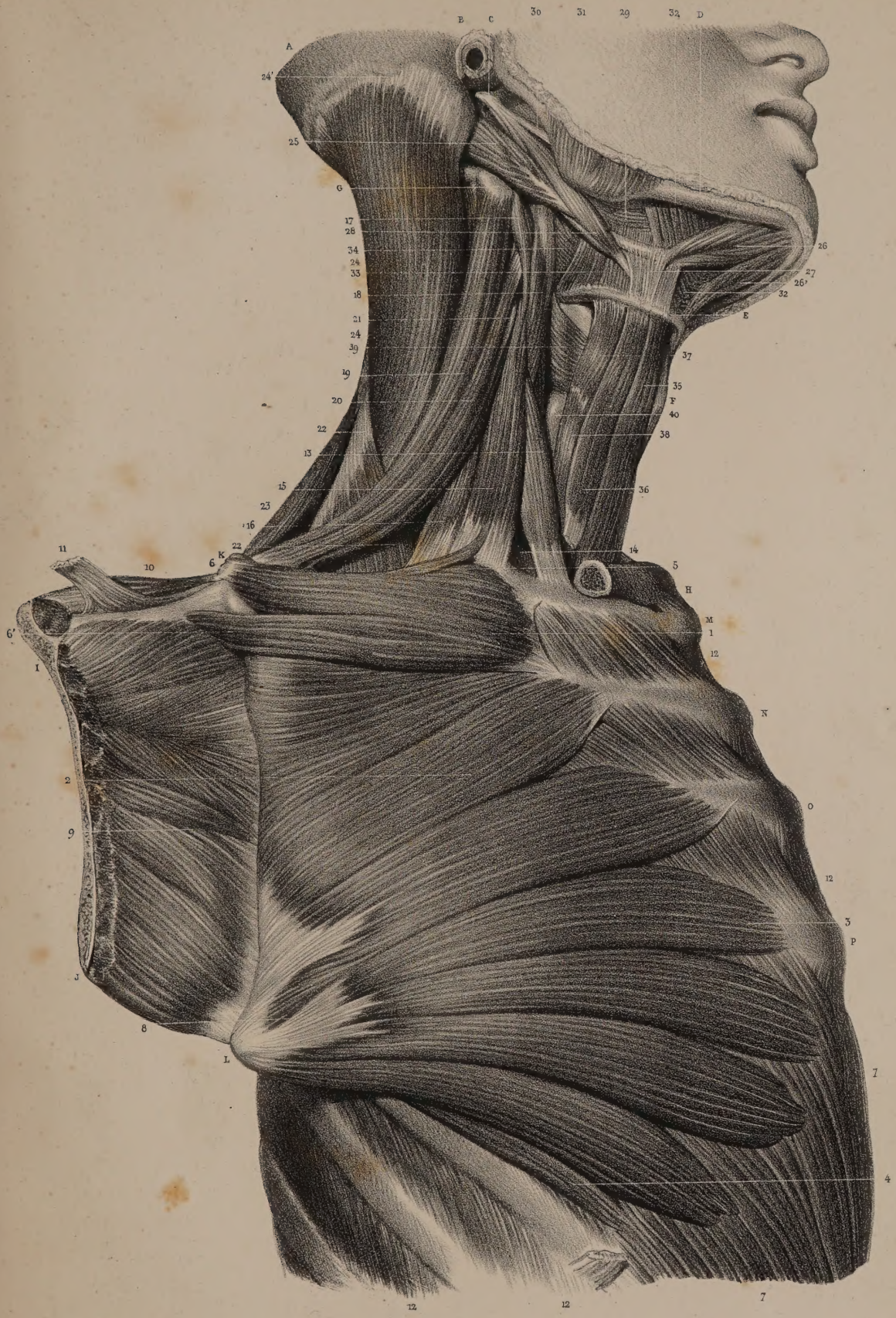
APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

LATERAL REGION OF THE TRUNK.

SECOND LAYER, *b*.

A, occipital bone: *B*, meatus auditorius externus: *C*, styloid process: *D*, inferior maxillary bone: *E*, os hyoides: *F*, thyroid cartilage: *G*, transverse process of the atlas: *H*, clavicle sawn in half: *I*—*J*, scapula detached from the trunk and turned outwards: *K*, superior angle of the scapula: *L*, inferior angle: *M*, *N*, *O*, *P*, the four upper ribs.

1---2---3---4, origin of the serratus magnus by eight digitations; 1, the first digitation, arising from the external surface of the first rib, from the upper border of the second, and from the intermediate aponeurosis. It is composed of two fasciculi, which are generally distinct in part of their extent: the superior one, 6, is often connected with the scalenus posticus by a fleshy slip, 5, and is inserted by tendinous fibres into the apex of the superior angle of the scapula; the inferior fasciculus, 6', is inserted into the internal surface of this angle. 2, the second digitation, arising from the external surface of the second rib; it is the broadest and thinnest of all; the third digitation is longer but not so broad as the preceding one; these two digitations form a large muscle, which is inserted, by tendinous fibres, into the base of the scapula. 3—4, the five inferior digitations, which are long and narrow, arise from the fourth, fifth, sixth, seventh, and eighth ribs, and decussate with the origins of the obliquus externus, 7—7; they form a radiated muscle which is inserted into the internal surface of the inferior angle of the scapula, by a flattened tendon, 8; 9, the subscapularis; 10, the supra-spinatus; 11, the omo-hyoideus; 12—12, external intercostal muscles; 13, the scalenus anticus: it arises from the external surface of the first rib by a flat tendon, and is divided superiorly into four portions which are inserted by tendons, into the anterior tubercles of the transverse processes of the third, fourth, fifth, and sixth cervical vertebræ, and into the notches in the transverse processes of the same; 14, space for the passage of the subclavian artery; 15—16, the scalenus posticus, divided into two portions; 15, the anterior portion, arising from the external surface of the first rib; the posterior portion, 16, is smaller, and arises from the superior border of the second rib. These two portions unite, and afterwards subdivide into six fasciculi, which run to be inserted into the posterior tubercles of the transverse processes of the six inferior cervical vertebræ: this muscle is often inserted by a distinct fleshy slip, 17, into the transverse process of the atlas; 18, the rectus capitis anticus major; 19---20---21, the levator anguli scapulæ, which is divided superiorly into three portions, which arise from the posterior tubercles of the transverse processes of the three upper cervical vertebræ: these three portions are united inferiorly, and are inserted into the superior angle and the superior portion of the base or posterior border of the scapula; 22—22, the serratus posticus superior; 23, the rhomboideus; 24---24, the splenius capitis; 24', its insertion into the apex and the external surface of the mastoid process and into the external third of the superior curved line of the occipital bone; 25—26, the digastricus, composed of two fleshy bellies united by a middle tendon: the posterior portion, 25, arises from the digastric fossa of the temporal bone; the anterior, 26, is inserted into the posterior surface of the inferior maxillary bone at the symphysis; 27, tendinous band, which fixes the tendon of the digastricus to the os hyoides; 26', anterior portion of the digastricus of the opposite side; 28, the stylo-hyoideus, crossed by the tendon of the digastricus; 29, fibres of the stylo-glossus; 30, stylo-maxillary ligament; 31, the masseter; 32---32, the mylo-hyoideus; 33, the hyo-glossus; 34, the constrictor pharyngis medius; 35, the sterno-hyoideus; 36, the omo-hyoideus; 37, the thyro-hyoideus; 38, the sterno-thyroideus; 39, the constrictor pharyngis inferior; 40, the thyroid gland.



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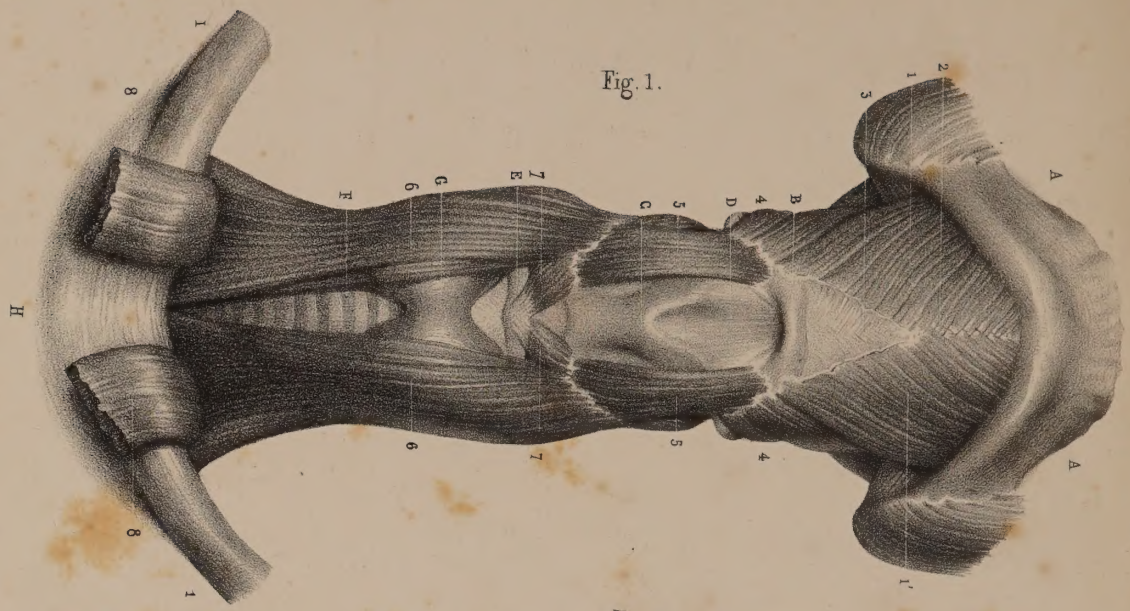
Pl. 45

Fig. 1.



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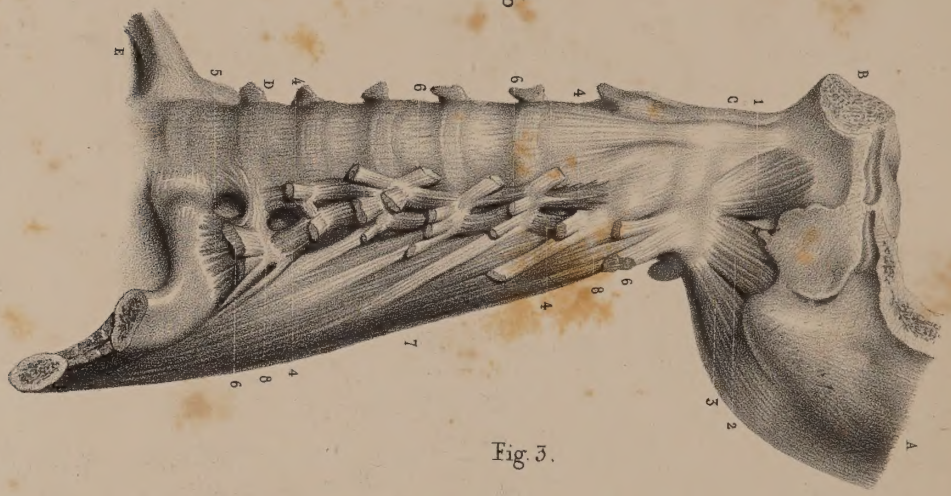

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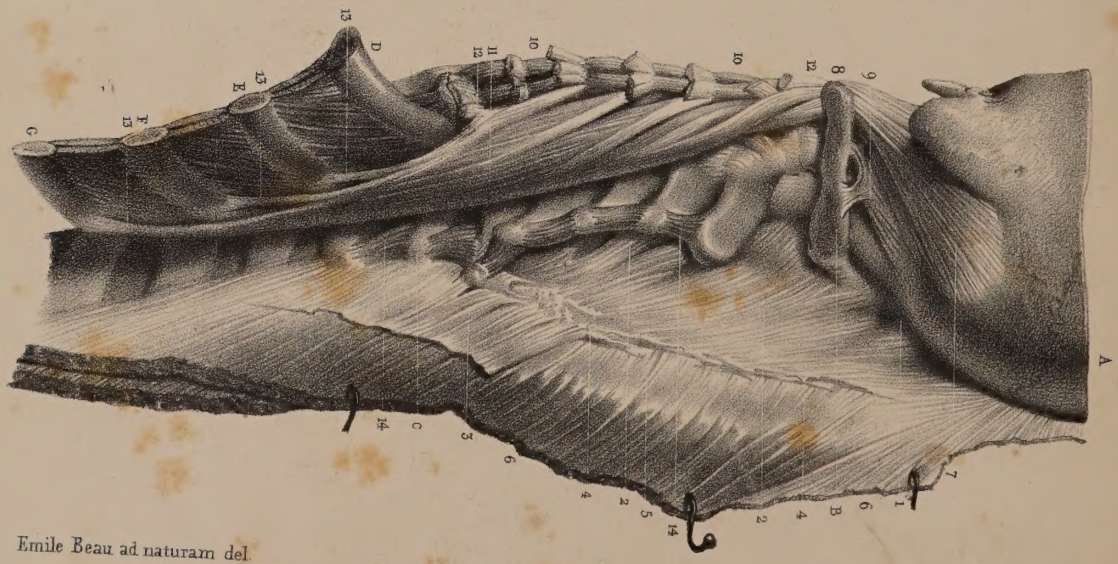

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PLATE XLV.

APPARATUS OF LOCOMOTION—THE MUSCLES.

HYOID REGION.

Fig. 1, *A A*, lower jaw; *B*, os hyoides; *C*, thyroid cartilage; *D*, hyo-thyroid membrane; *E*, cricoid cartilage; *F*, trachea; *G*, thyroid body, or gland; *H*, sternum; *I*, clavicle.

1—1', mylo-hyoideus muscle, arising from the lower jaw, along the whole line of the same name, and inserted into the body of the os hyoides; **2**, anterior, **3**, middle, and **4**, posterior fibres of the mylo-hyoideus; **5**, thyro-hyoideus muscle extending between the oblique line of the thyroid cartilage to the posterior aspect of the body of the os hyoides; **6**, sterno-thyroideus; **7**, crico-thyroideus; **8**, sterno-hyoideus, divided.

PREVERTEBRAL REGION.

SECOND LAYER.

Fig. 2, *A*, posterior part of the cranium; *B*, basilar process; *C*, *D*, bodies of the cervical vertebræ; *E*, first rib.

1, rectus anticus minor capitis, extending between the basilar process of the os occipitis and the atlas; **2**, rectus capitis lateralis, extending between the transverse process of the atlas and jugular surface of the os occipitis; **3**, obliquus superior capitis; **4—4**, inter-transversales cervicis, two in number for each intervertebral space, and running, as their name implies, between one transverse process and another; the most inferior of them finds its lower point of attachment to the posterior extremity of the first rib; **6—6**, tendons of muscles inserted into the transverse processes of the cervical vertebræ; **7**, transversalis cervicis; **8—8**, its insertions into the transverse processes of the cervical vertebræ.

LATERAL REGION OF THE NECK.

THIRD LAYER.

Fig. 3, *A*, posterior part of the skull; *B*, posterior arc of the atlas; *C*, spine of the seventh cervical vertebra; *D*, *E*, *F*, *G*, the first four ribs.

1, 2—2, median fibrous lamina, situated between the complexi muscles, and stretching between the spines of the cervical vertebræ, and the external occipital ridge and protuberance; it is formed mainly by the tendinous insertions of the rhomboidei and serrati parvi **3**, of the splenii **4—4**, and trapezii, **5—6—6**; **7—8**, obliquus capitis superior; **9**, posterior occipito-atlantal ligament; **10**, intertransversalis cervicis; **11**, transversalis cervicis; **12—12**, its tendons of insertion attached to the posterior tubercles of the cervical vertebræ, and **13—13**, its tendons of origin implanted into the four first dorsal vertebræ; **14—14**, interspinales cervicis, two in number for each interspace; they arise from, and are inserted into, the bifurcations of the spinous processes.

PLATE XLVI.

APPARATUS OF LOCOMOTION—THE MUSCLES.

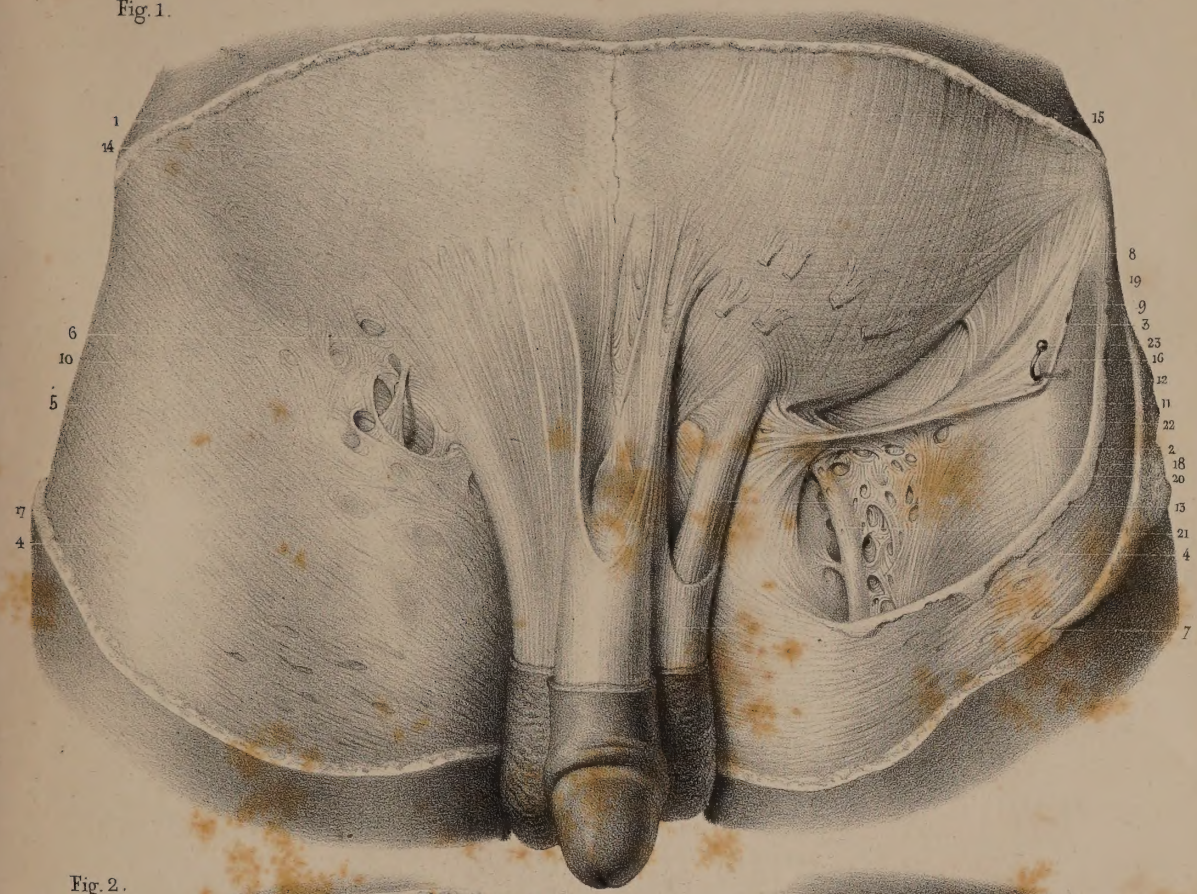
ABDOMINAL APONEUROSIS.

ANTERIOR PLANE.

Fig. 1, 1, subcutaneous abdominal fascia (deep layer, the more superficial layer not being distinguishable from the subcutaneous cellular tissue, whilst in lean and muscular subjects this deeper one is very distinct); 2, its connection with the spine of the pubis, and ligament of Gimbernat, which it aids in forming; 3, fascia lata femoris, with which the abdominal superficial fascia blends; 4, subcutaneous fascia of the thigh (deep layer) attached externally to the iliac spine, and to the outer half of Poupart's ligament, externally, to the spine, and descending ramus of the pubis; it is pierced with many holes, 5, opposite the crural canal; 6—7, dartos, connected by little aponeurotic fibres with Poupart's and Gimbernat's ligament, with the pillars of the ring and the abdominal aponeurosis; the innermost portion of the dartos, 10, constitutes the superficial lamina of the suspensory ligament of the penis; 11, internal pillar of the inguinal ring; 12, arched fibres binding down the inguinal ring externally; 13, spermatic chord; 15, linea alba; 16, femoral arch, ligament of Poupart or Fallopius; 17, internal portion of the fascia lata; 18—19, external portion of the same, intimately connected with the outer half of Poupart's ligament; 20, part of the fascia lata perforated with many holes; 21, vena saphena interna; 22—23, femoral canal, covered in part by the subcutaneous fascias of the abdomen and thigh.

Fig. 2, 1, aponeurosis of the external oblique, which at 2, as well as the femoral arch at 3, has been removed from the left side; 4, internal oblique; 5, its aponeurosis; 6, inferior edge of the internal oblique; 7, femoral arch; 8—9, a bundle of fibres which has been described apart, under the name of ventral fascia; 10, femoral canal; femoral infundibulum; its base corresponds to the femoral arch; its summit embraces the vena saphena at the point of its anastomosis with the femoral vein: 11—12, the fibres which, from different points, concur in forming the femoral canal; 13—14, femoral canal laid open, and seen to contain the femoral artery, 16, to the outside; the femoral vein, 17, to the inside; it is within this internal portion of the canal that femoral hernia is included; 18, saphena vein; 19, fascia lata; 20, cremaster, composed of the two fleshy fasciculi, of which the more external, 21, which appears to arise from Poupart's ligament, may be followed as far as the anterior and superior spinous process of the ilium; 22, its internal slip, arising from the spine of the pubis. The two slips together inclose the spermatic cord, and terminate on the testis. The cremaster is entirely independent of the internal oblique, and transversalis muscles; 23, a little slip of the fibres of the cremaster, which, from the internal origin, passes over in an arched form to join the external slip; 24, suspensory ligament of the penis.

Fig. 1.



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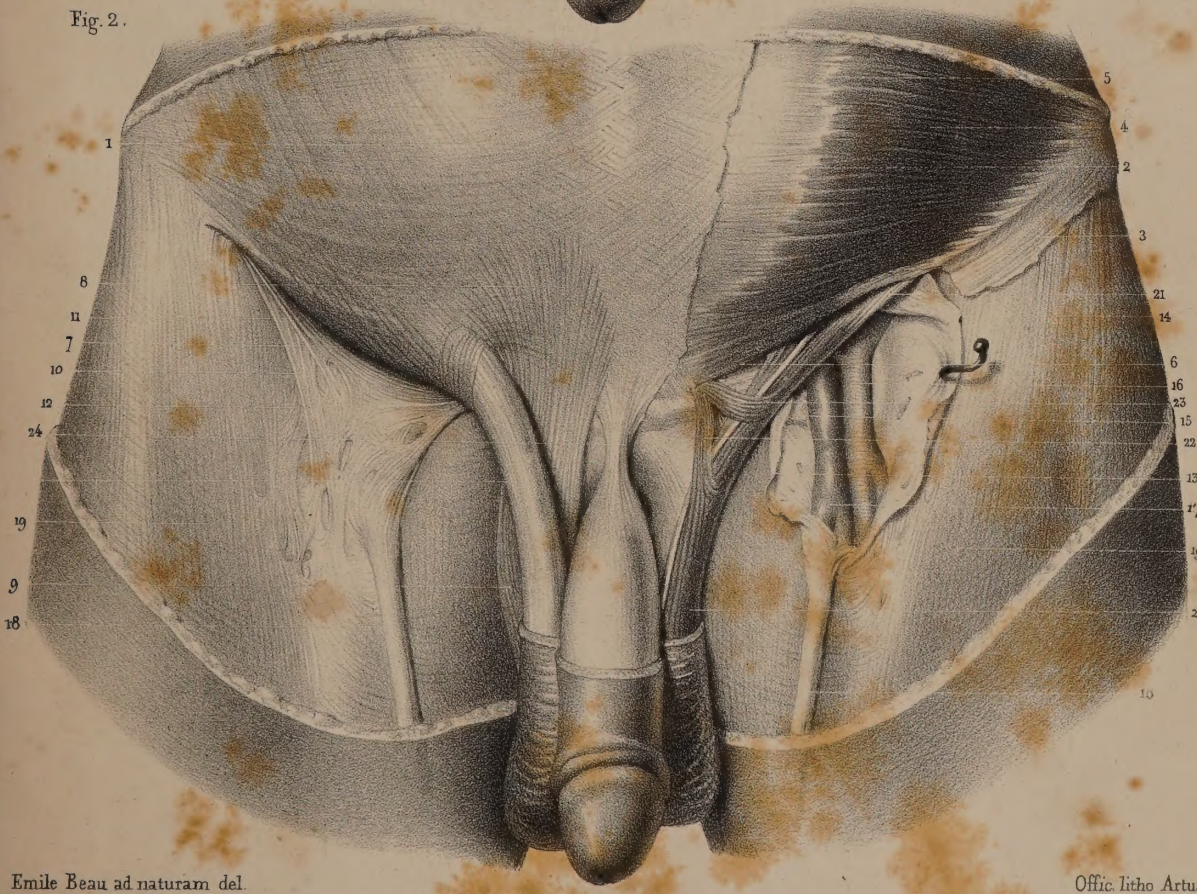

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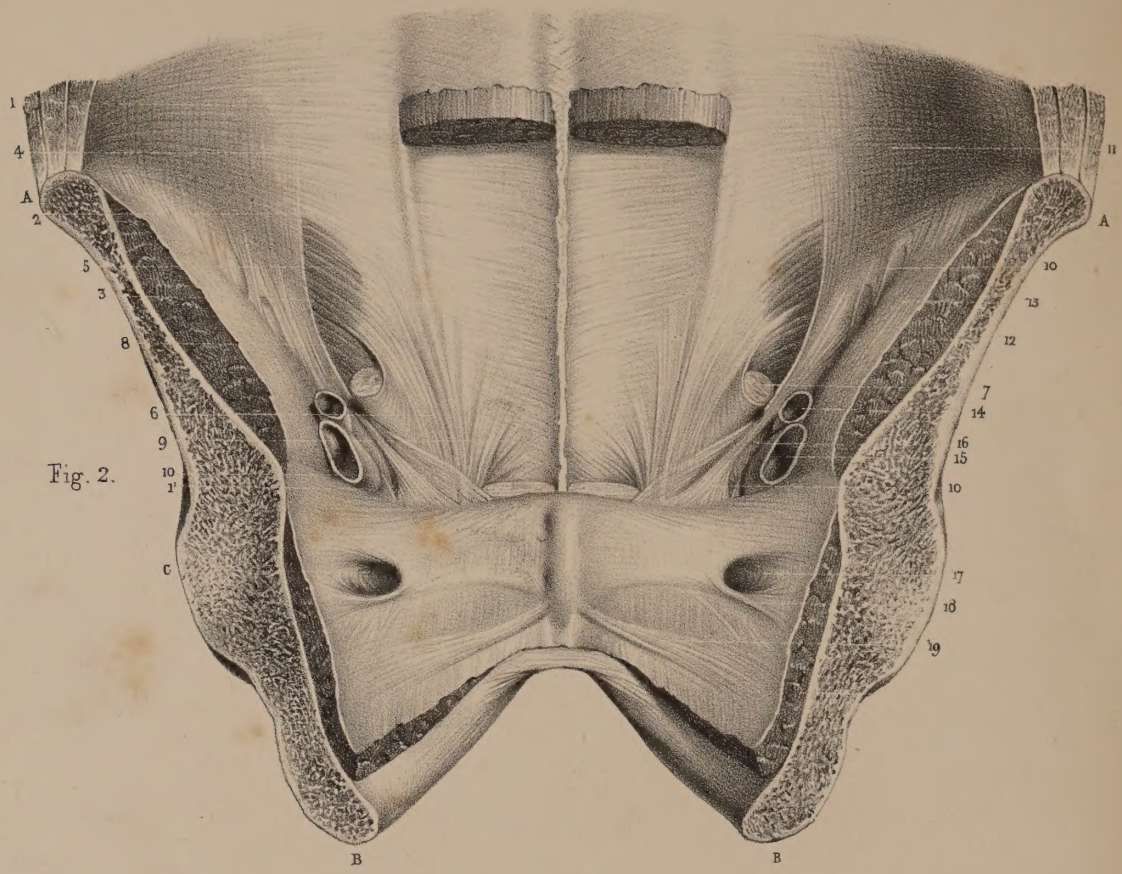

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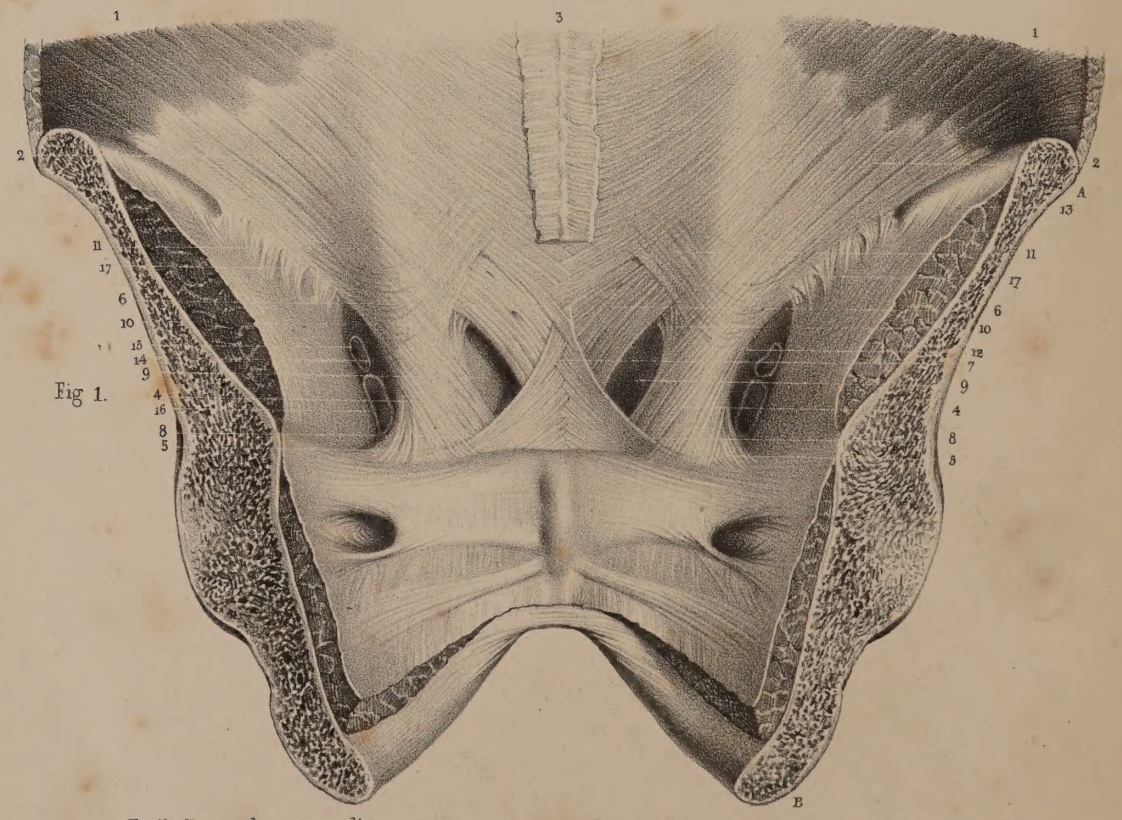

Fig 1.

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PLATE XLVII.

APPARATUS OF LOCOMOTION—THE MUSCLES.

ABDOMINAL APONEUROSIS.

POSTERIOR PLANE.

Fig. 1, *A*, spine of the ilium; *B*, tuberosity of the ischium.

1, external oblique, and 2, its aponeurosis; 3, linea alba; 4, external or inferior pillar of the inguinal ring; 5, Gimbernat's ligament; 6, internal pillar of the ring, which decussates 7 with that of the opposite side, the two together forming a triangle, which has been described under the name of the ligament or fascia of Colles; 8, some fibres of the right external pillar which decussate with the corresponding fibres of the left side; 9, inguinal ring, of a triangular shape, bounded by the pillars on either side and inferiorly; its summit is defined by curved fibres, 10, which arise from the spine of the pubis (vide Pl. XLVI), and strengthened by a plane of oblique fibres, 11, which are reflected from within outwards, to unite themselves to the femoral arch; 12—13, femoral arch; 14, commencement of the femoral infundibulum, within which are seen 15—16 the femoral vessels; 17, fibrous bands which connect the femoral arch with the fascia iliaca.

Fig. 2, *A*, crista ilii; *B*, tuber ischii; *C*, symphysis pubis.

1, rectus abdominis; 1', its tendinous insertion; 2, its anterior sheath; 3, linea alba; 4, fascia of the transversalis; 5, its lower fleshy portion, the fibres seen curving at 6, proceeding to be inserted into the pectineal crest, and aiding in the formation of the posterior wall of the inguinal canal; 8, lower portion of the internal oblique; 9, fibres belonging to the internal pillar of the ring; 10—10, fibrous slip, extending from the crista ilii to the superior edge of the pubis and pectineal crest, which has been described as the ilio-pubic slip by A. Thomson, who has shown that the ligament of Poupart is not reflected backwards and upwards to become continuous with the fascia of the transversalis, but that behind this ligament there is a slip, entirely distinct, which constitutes a second femoral arch. The ilio-pubic slip, in its inner half, is quite distinct, and appears as soon as the peritoneum is removed; in its outer half it is intimately connected by its upper aspect with the internal oblique and transversalis muscles, by its inferior aspect, with the fascia iliaca, from which it is separated by the circumflex iliac vessels; by its anterior aspect it is connected with the fascia lata and ligament of Poupart; and by its posterior aspect with the fascia transversalis; 11, external portion of the transversalis; 12, iliacus internus; 13, fascia iliaca; 14—15, iliac vessels at their entrance into the femoral infundibulum; 16, a thin membrane perforated with many holes; 17, obturator or sub-pubic foramen; 18, slip of fibres which bound it inferiorly; 19, fibrous slip which gives attachment to the levator ani muscle.

PLATE XLVIII.

APPARATUS OF LOCOMOTION—THE MUSCLES.

ABDOMINAL APONEUROSIS.

POSTERIOR PLANE.

Fig. 1, 1, external, and 2, internal oblique muscles; 3, transversalis; 4—5, ilio-pubic slip; 6—7, fascia transversalis; it is situated between the abdominal muscles and peritoneum; 6, its external portion, which is cellular; 7, its internal portion intimately connected with the tendon of the rectus, and attached to the pectineal ridge in front of the ilio-pectineal slip; it aids in forming the posterior paries of the inguinal canal; 8, internal inguinal ring; 9—10, slips of the fascia transversalis which bound it; 11, inferior portion of the rectus muscle; 12, its tendon inserted at 13 into the pectineal ridge; 14—15, supra-pubic ligament, formed of the most internal fibres of the tendons of the recti, and decussating on the mesial line; 16, fascia iliaca; 17—18, external iliac vessels; 17', epigastric artery; 19, septum crurale, continuous with the fascia transversalis; 20, internal division of the femoral infundibulum, lodging the femoral vein; 21, ligament of Cooper.

Fig. 2, *A*, sacrum; *B*, symphysis pubis; *C*, iliac crest.

1, psoas magnus and iliacus internus, 2, tendon of the psoas parvus; 3—3, superficial lamina of the fascia lata; 4, posterior wall of the femoral infundibulum, distinct from the ascia lata, and constituted by an expansion of the tendon of the psoas parvus, 5; 6, 7, 8, femoral vessels; 9, inferior extremity of the rectus; 10, part at which the fascia lata, the external half of Poupart's ligament, the fascia transversalis, the ilio-pubic slip, and the fascia iliaca are all intimately connected.

Figs. 3 and 4, 1, umbilical ring, bounded or constituted by the interlacement of the fibres, 2—3, of the abdominal aponeurosis. It is never entirely obliterated on the abdominal aspect; some slight opening is always found even in aged subjects; 4—5, the umbilical vessels changed into fibrous tissue; 6—7, strong bands of thickened cellular tissue.

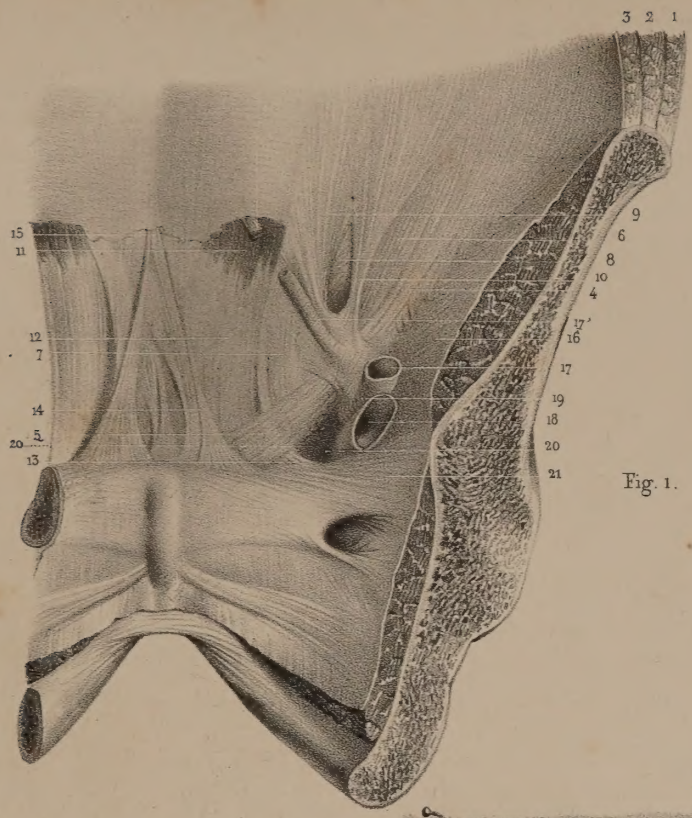
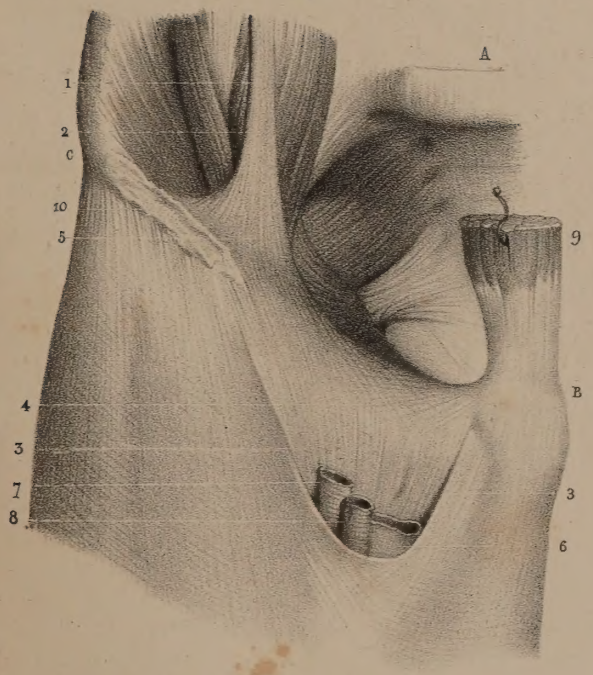


Fig. 1.

Fig. 2.



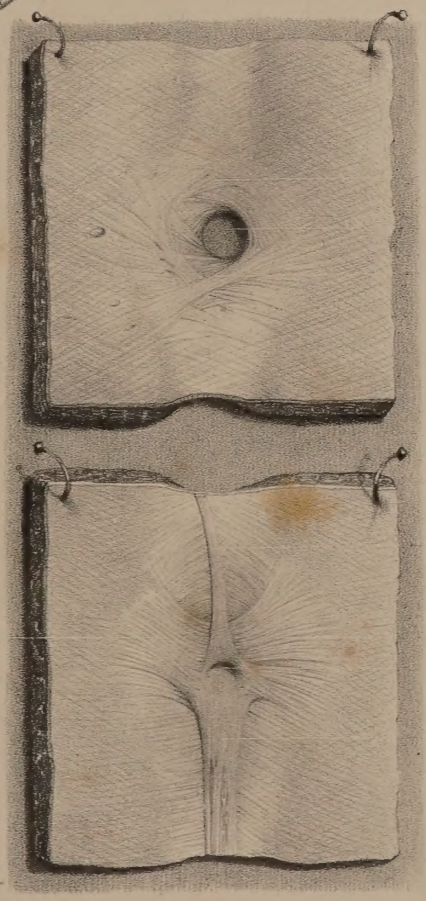


Fig. 3.

Fig. 4.

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Pl.49.

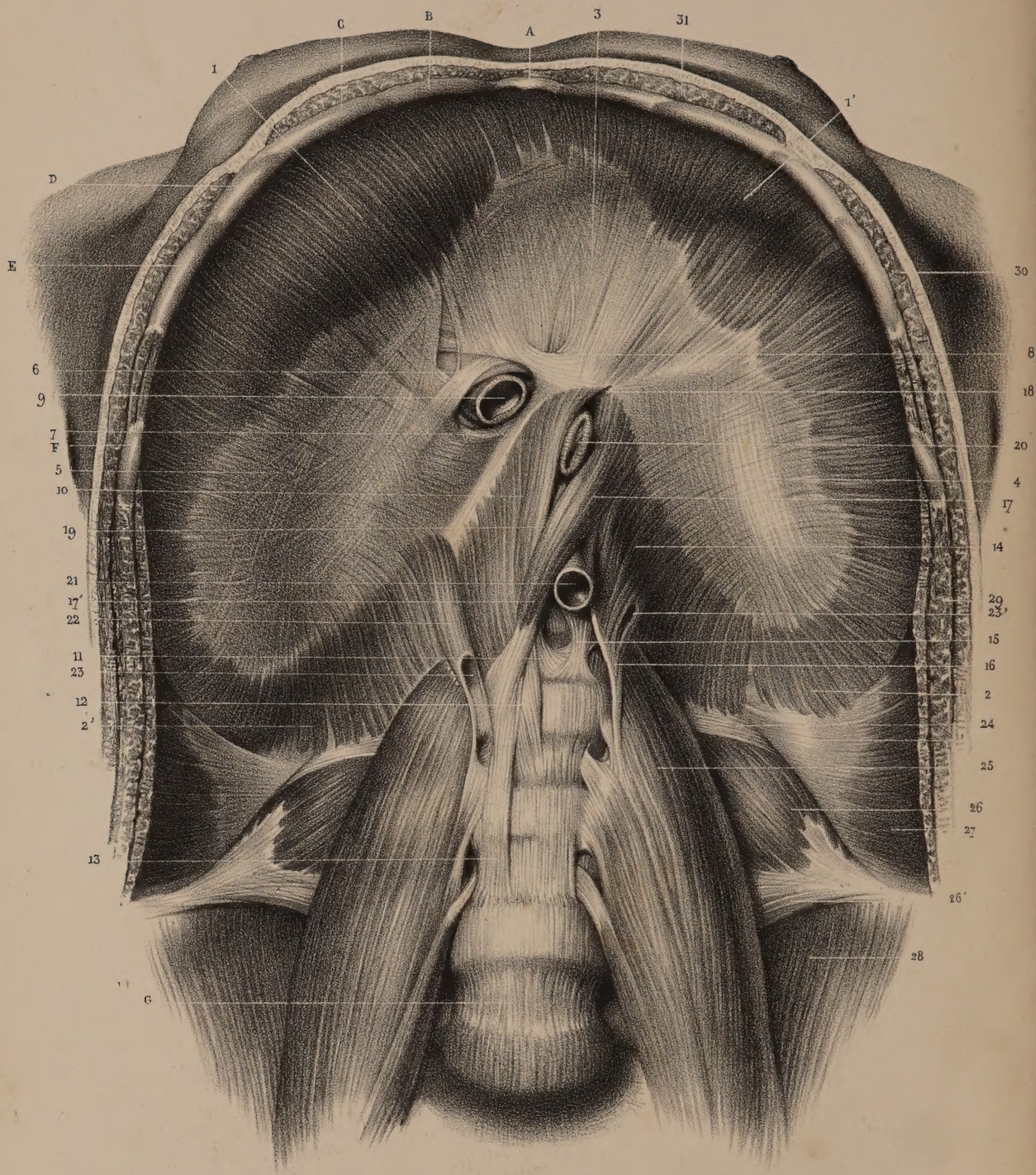

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PLATE XLIX.

APPARATUS OF LOCOMOTION—THE MUSCLES.

DIAPHRAGMATIC REGION.

INFERIOR OR ABDOMINAL ASPECT OF THE DIAPHRAGM.

A, endiform cartilage; *B*, cartilage of the seventh rib; *C*, of the eighth rib; *D*, of the ninth; *E*, of the tenth; and *F*, of the eleventh rib; *G*, body of the fifth lumbar vertebra.

The diaphragm forms a vault on its abdominal aspect, the concavity of which is more considerable to the right, where the liver lies, than to the left, where it corresponds to the great arch of the stomach and spleen. Bounded by the inferior circumference of the thorax, the diaphragm is attached to the sternum, ribs, and the vertebral column. The fleshy fibres, 1—1', 2—2', which arise from these different parts, converge towards or around a tendon, 3—4—5, which occupies the centre of the muscle. This aponeurotic tendon presents something of the shape of a trefoil leaf, and is spoken of as the phrenic or nervous centre. The leaflets are of unequal size: the middle one, 3, is the broadest; the right one, 4, is not quite so broad; and the left, 5, is the smallest of the three. Between the right and middle leaflet there is an oval-shaped aperture, circumscribed by three or four tendinous fasciculi, 6—7—8, which decussate. This aperture, which is frequently converted into a true canal, transmits the vena cava inferior, 9. The tendinous centre is composed of several layers of fibres, united into irregular, straight, or curved fasciculi, which cross each other in all directions; in general, however, they proceed in a radiating manner from the posterior notch, towards the circumference of the folioli, or tendinous leaflets. Two large fleshy bundles, which go by the names of the *pillars* of the diaphragm, terminate in the posterior notch of the tendinous centre. The right fleshy bundle or pillar, 10, of much greater size than the left, and running more nearly in the mesial line, arises from the bodies of the second, third, and fourth lumbar vertebræ by the tendons, 11—12—13, which blend with the anterior ligamentous apparatus of the spinal column; the left pillar, 14, which is situated laterally on the bodies of the vertebræ, arises from the body of the second lumbar vertebra by a tendon, 15, which decussates on the mesial line with the corresponding tendon of the right pillar. The left pillar is frequently connected with the psoas muscle, 16, by means of a small fibrous slip. The space which lies between the two pillars is divided into two apertures, by means of two fasciculi of communication, which decussate mutually, and the anterior of which, 17—17', coming from the left to the right pillar, is the more considerable. The superior of the two apertures, 18—19, just mentioned, gives passage to the œsophagus, 20, and is named the œsophagian aperture; it also transmits the pneumogastric nerve: the fleshy fibres which circumscribe or bound it decussate, to form its superior and its inferior commissure. The inferior aperture, again, transmitting the aorta, 21, is entitled the aortic aperture; it also transmits the thoracic duct: it is strengthened by a fibrous arch, which is continuous laterally with the tendons of the pillars. Independently of these two pillars of the diaphragm, we frequently meet with two small or accessory pillars, 22, separated from the great pillars by an opening, 23—23', which, on the right side, transmits the vena azygos and the cord of communication between the thoracic and abdominal great sympathetic. 24, ligamentum arcuatum (vide PLATE L.); 25, psoas magnus muscle; 26, quadratus lumborum; 27, transversalis abdominis; 28, iliacus internus; 29, section of the obliquus internus; 30, section of the obliquus externus; 31, section of the rectus abdominis.

PLATE L.

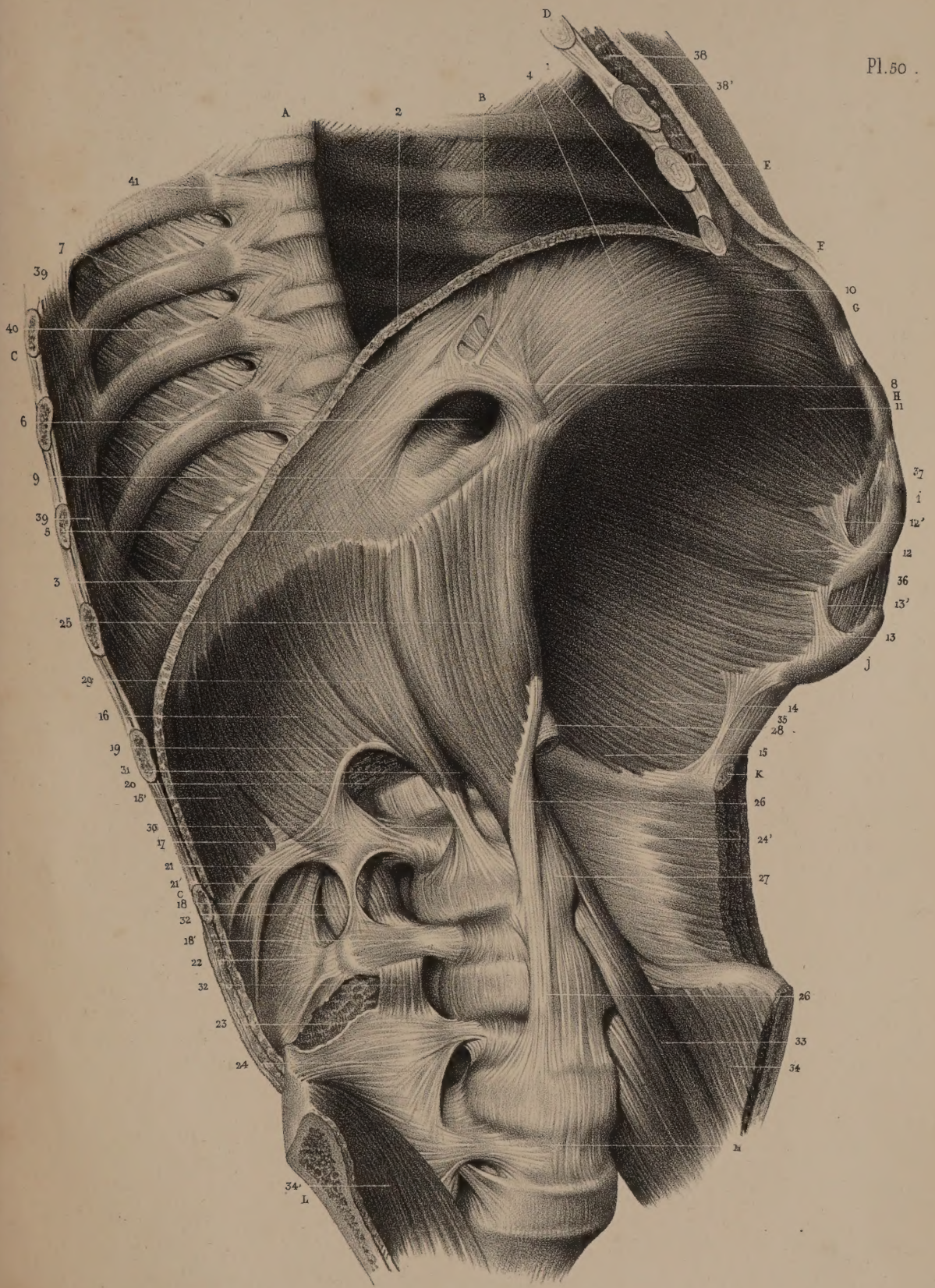
APPARATUS OF LOCOMOTION—THE MUSCLES.

DIAPHRAGMATIC REGION.

INTERNAL LATERAL ASPECT OF THE DIAPHRAGM.

A, vertebral column; *B*, left cavity of the chest; *C C'*, the six last ribs of the left side; *D*, *E*, cartilages of the fourth, fifth, sixth, and seventh ribs of the right side; *F*, ensiform cartilage; *G*, *H*, *I*, *J*, cartilages of the eighth, ninth, tenth, and eleventh ribs of the left side; *K*, anterior extremity of the twelfth rib.

1—2—3, section of the lateral portion of the diaphragm through its whole height; 4, middle leaf of the tendinous centre; 5, right leaf; 6, inferior orifice of the funnel-shaped canal which transmits the vena cava inferior; it is oval in form, and circumscribed by the fibrous slips, 7—8—9, which interlace. The fleshy fibres of the diaphragm are seen radiating in all directions outwards from the tendinous centre: the anterior fibres, 10, very short, proceed downwards and forwards to find their attachment on the posterior aspect of the xiphoid cartilage. The lateral fibres, 11—12—13—14—15, are the most numerous and also the longest, and proceed diverging, and describing a curve whose sweep is greater on the right than on the left side, to be inserted by digitations into the internal aspects and upper edges of the cartilages of the five last ribs; the most inferior digitations are attached to the ribs themselves. Some few fibres terminate on aponeurotic fibres in the intercostal spaces, 12'—13'. The most posterior of the lateral fasciculi, 15'—16, are inserted either into the transverse process of the second lumbar vertebra, 17, and sometimes into that of the third also, 18, by means of a tendinous expansion; the others end on two aponeurotic arches. The first of these aponeurotic arches, 19, extends from the tendon of the small accessory pillar to the transverse process of the second lumbar vertebra, the psoas muscle, 20, passing under it. The second arch, 21—21', is called the ligamentum arcuatum diaphragmatis; it is formed by the superior edge of the anterior lamina of the fascia of the transversalis folded, and by some fibres of the middle lamina. It extends from the transverse process of the second lumbar vertebra to the apex and lower edge of the last rib; under it passes the quadratus lumborum muscle. 22, middle lamina of the fascia of the transversalis; 23, inferior portion of the quadratus lumborum, covered by the anterior lamina of the fascia transversalis; 24—24', transversalis muscle, and the anterior lamina of its aponeurosis; 25, right pillar of the diaphragm, arising from, or inserted by, a tendon, 25—26', to the bodies of the four first lumbar vertebræ; 27, anterior ligamentous apparatus of the spine; 28, aorta; 29, small accessory pillar of the right pillar, arising by a tendon, 30, from the right lateral aspect of the body of the second lumbar vertebra; 31, opening for the passage of the vena azygos and great sympathetic; 32—32, intertransversales lumborum muscles; 33, psoas magnus; 34, iliacus internus; 35—36—37, intercostals; 38, pectoralis major of the right side divided; 38', integument; 39—39', subcostals; 40, internal intercostals; 41, anterior costo-vertebral ligament.



Emile Beau ad naturam lith.

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Pl. 51.

Fig. 1.

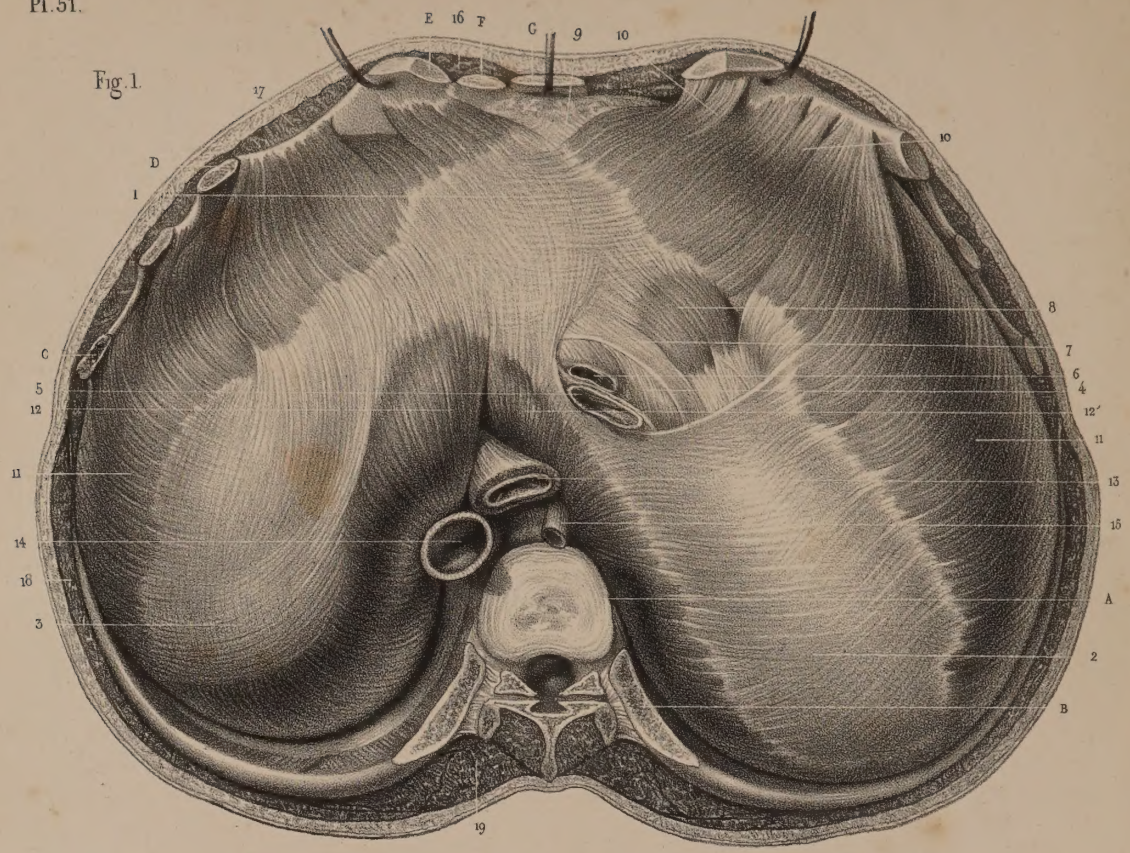

Fig. 2.

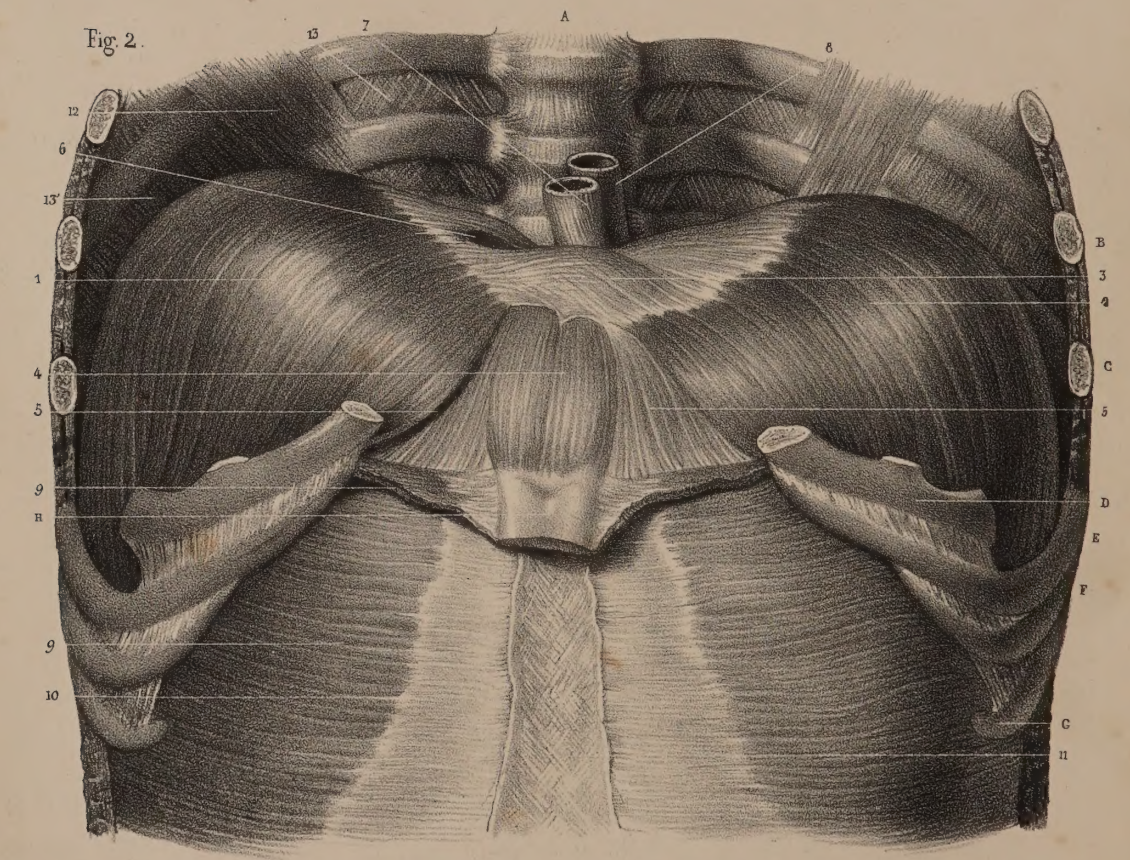

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PLATE LI.

APPARATUS OF LOCOMOTION—THE MUSCLES.

DIAPHRAGMATIC REGION.

Fig. 1, superior or thoracic surface of the diaphragm; *A*, body of the tenth dorsal vertebra; *B*, posterior extremity of the tenth rib; *C*, *D*, *E*, *F*, cartilages of the sixth, seventh, eighth, and ninth ribs; *G*, ensiform cartilage.

1—2—3, tendinous centre of the diaphragm; 4, hole which transmits the vena cava abdominis, 5, and sometimes the right trunk of the hepatic veins, 6; it is defended by the tendinous fibres, 7, which interlace. 8, A fleshy plane which is often met with situated transversely between the right and middle foliolus of the tendinous centre. It ends in tendinous fibres upon the edge of the hole which transmits the vena cava. From the whole circumference of the tendinous centre, the fleshy fibres of the diaphragm proceed like rays; the anterior, where they exist, are very short (see fig. 2), and are inserted into the ensiform cartilage; their place is frequently supplied by a triangular space, 9; the lateral muscular fibres, 10—11—12, diverge, and are implanted upon the upper edges and inner surfaces of five inferior ribs. The posterior fibres, 12 12', constitute what are called the pillars of the diaphragm; they separate, to give passage to the œsophagus, 13, to the aorta, 14, and to the vena azygos, 15; 16, psoas magnus divided; 17, external oblique; 18, latissimus dorsi; 19, mass of muscles of the back.

Fig. 2, Profile view of the superior surface of the diaphragm; *A*, seventh dorsal vertebra; *B*, seventh rib; *C*, eighth rib; *D*, *E*, *F*, *G*, cartilages of the eighth, ninth, tenth, and eleventh ribs; *H*, ensiform cartilage turned down.

1—2, lateral convex parts of the diaphragm; the convexity being greater on the right than on the left side; 3, middle nearly plane part, which supports the heart; 4, anterior fibres inserted into the base of the ensiform cartilage; 5—5, a few pale fibres which lose themselves on the fascia of the transversalis; 6, orifice for the vena cava inferior; 7, œsophagus; 8, aorta; 9—9, transversalis; 10, its aponeurosis; 11, linea alba; 12, sub-costals; 13, internal intercostals; 13', external intercostals.

PLATE LII.

APPARATUS OF LOCOMOTION—THE MUSCLES.

Fig. 1, *A*, outer end of the clavicle; *B*, *C*, coracoid ligaments; *D*, acromion; *E*, superior angle of the scapula; *F*, humerus.

1—2—3—4—5—6, subscapularis, arising from the whole of the under surface of the scapula, and inserted, tendinous, into 9 the lesser tuberosity of the humerus; 7—8, insertion of the serratus magnus; 10, teres major; 11, fleshy fasciculus, which unites with the latissimus dorsi; 12, upper end of the latissimus dorsi, turning round the teres major, and terminating with it in a flattened tendon, which is inserted into the inner edge and bottom of the bicipital groove; 14, tendon of the pectoralis major, inserted into the anterior edge of the bicipital groove; 15, insertion of the deltoid; 16, upper end of the brachialis internus; 17, triceps extensor cubiti.

Fig. 2, *A*, superior angle of the scapula; *B*, inferior angle; *C*, spine; *D*, acromion retrenched.

1—2, supraspinalis, arising from the two inner thirds of the supra spinalspace, and ending tendinous under the acromial arch, to be inserted into the superior facette of the great tuberosity of the humerus, 3; 4—5, infraspinatus, arising from the two inner thirds of the infraspinal space; the fleshy fibres unite into two distinct bundles, which gather round the strong tendon, 7, and this is inserted into the middle facette of the greater tuberosity of the humerus; 8, teres minor, which arises from the rough triangular surface that bounds the infraspinal space inferiorly, and from two fibrous layers that separate it from the teres major and infraspinatus; it is inserted by a flattened tendon 9 into the inferior facette of the great tuberosity of the humerus; 10, teres major, arising from the outer aspect of the inferior angle of the scapula, and the inferior third of the anterior edge of the bone. It proceeds somewhat upwards, to be attached to the humerus, along the posterior edge of the bicipital groove; 11—12—13, a little fleshy slip which unites with the latissimus dorsi; 14, upper end of the latissimus dorsi; 15, long head of the biceps; 16, outer head of the same muscle.

Fig. 1.

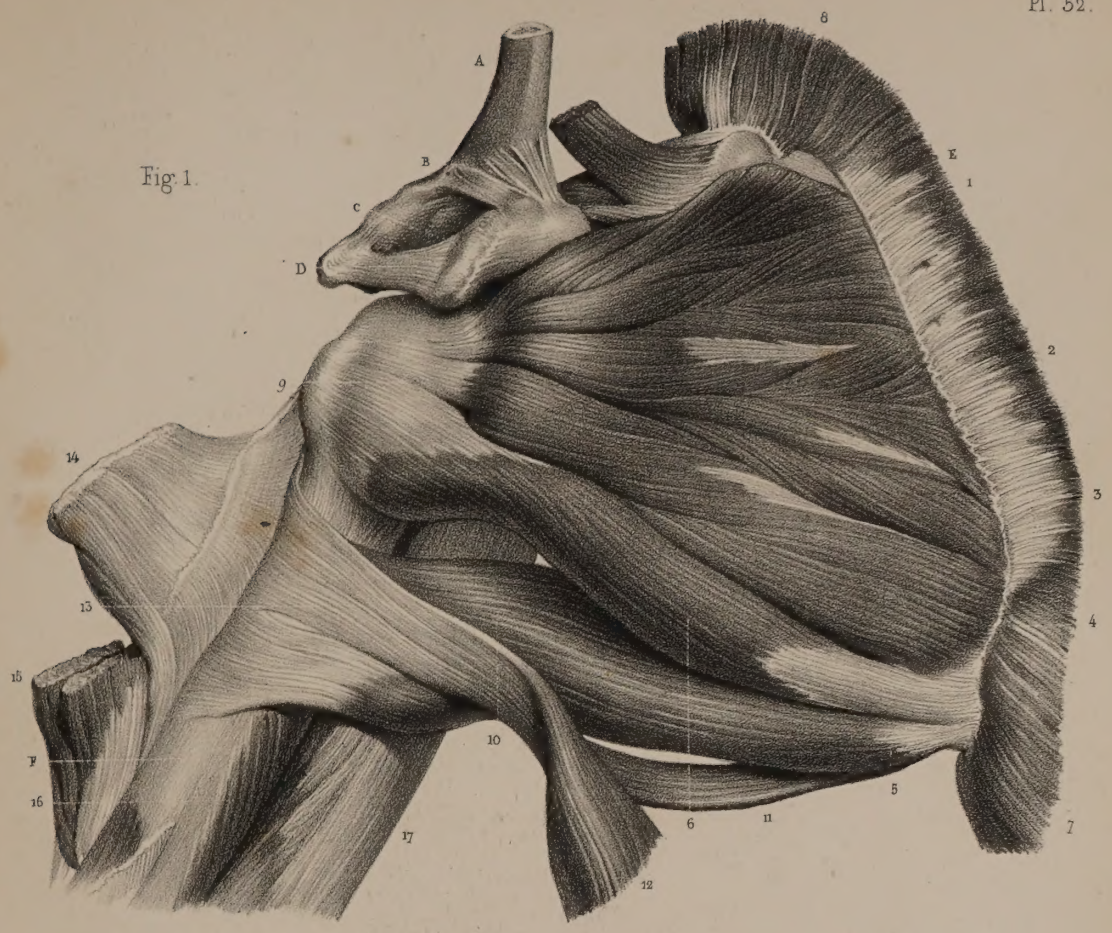

Fig. 2.

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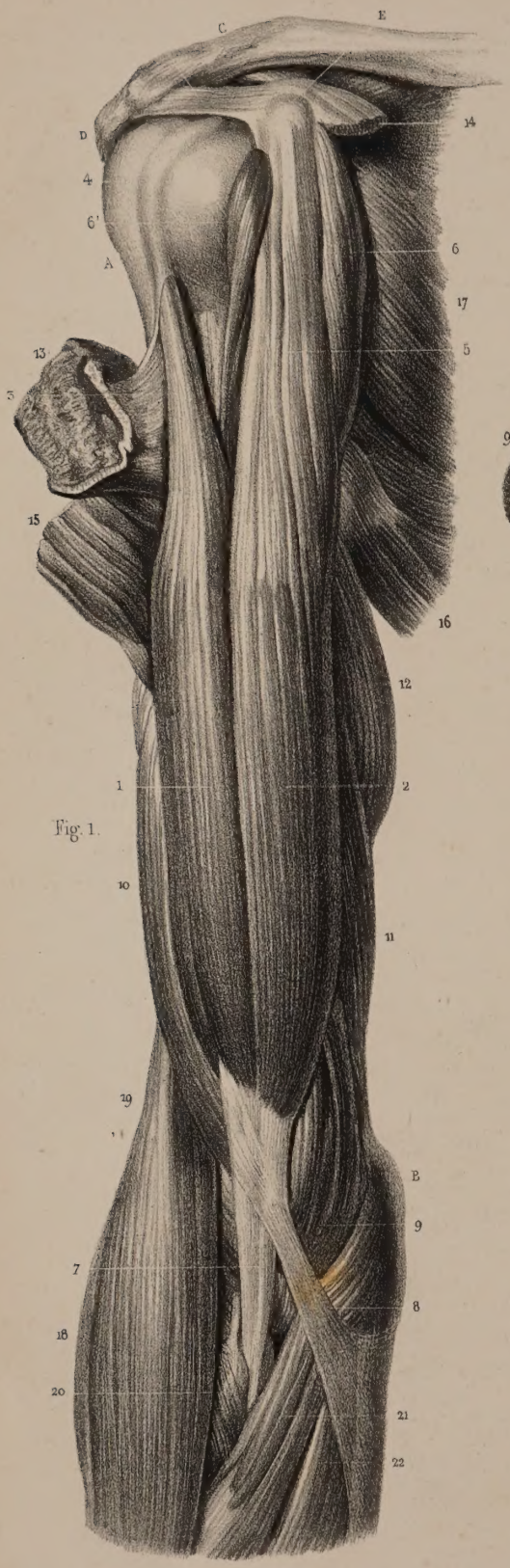

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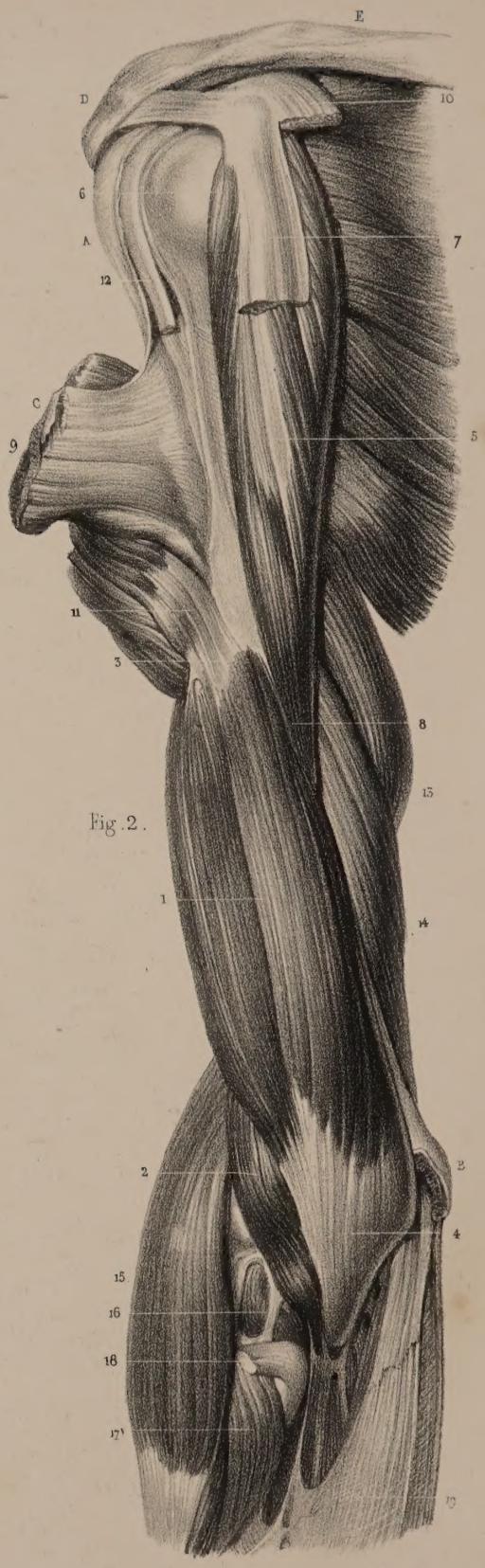

Fig. 2.

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PLATE LIII.

APPARATUS OF LOCOMOTION.—THE MUSCLES.

ANTERIOR REGION OF THE ARM.

FIRST LAYER.

Fig. 1. *A*, head of the humerus; *B*, its internal tuberosity; *C*, the clavicle; *D*, acromion process; *E*, coracoid process.

1—2, the biceps brachialis, composed of two fasciculi: 1, the external or long portion arises from the superior part of the glenoid cavity, by a tendon, 3—4, which is continuous with the fibro-cartilaginous ring which forms the margin of that cavity. This tendon traverses the scapulo-humeral articulation, enclosed in a sheath of synovial membrane, is reflected on the head of the humerus, being there slightly flattened, and gains the bicipital groove, where it lies surrounded by the same synovial sheath. It is kept in its place by a fibrous expansion, formed for the most part by the tendon of the pectoralis major muscle, which stretches across the groove. By and by the muscle emerges, and spreads out into a broad aponeurosis, which gives origin to the fleshy fibres. 2, the internal fasciculus or short portion, which arises from the apex of the coracoid process by a tendon, 5, which is common to it and the coraco-brachialis muscle, 6—6'. The internal and external portions of the biceps become connected about the middle of the arm; the two fascicula, however, are distinct, although in apposition. They end by mixing, and terminate in a flattened tendon, 7, which glides upon the front of the bicipital tuberosity of the radius, between which and it there is a bursa or synovial capsule interposed, to be finally inserted into the posterior and lower part of the tuberosity just named. The tendon of the biceps sends a great expansion, 8, into the aponeurosis of the fore arm. 9—10, brachialis anticus muscle; 11—12, the triceps extensor cubiti muscle; 13, tendon of the pectoralis major; 14, tendon of the pectoralis minor, 15, tendon of the deltoid; 16, the latissimus dorsi and teres major muscles united; 17, the sub scapularis muscle; 18, extensor carpi radialis longior; 19, the supinator longus; 20, the supinator brevis; 21, pronator radii teres; 22, palmaris longus.

SECOND LAYER.

Fig. 2. *A*, head of the humerus; *B*, internal tuberosity; *C*, bicipital groove; *D*, acromion process; *E*, clavicle.

1—2, brachialis anticus. This muscle arises below and from the sides of the deltoid impression on the humerus, 3, embracing the tendon of insertion of the deltoid, 11, with which it is continuous; from the internal and external aspects of the humerus, from the internal and external borders of the same, and from the intermuscular aponeuroses which take their origins there. From these different origins the fleshy fibres proceed to terminate on the posterior surface of a very thick tendon, 4, which is implanted into a rough impression situated immediately behind the coronoid process of the ulna. The brachialis anticus is covered by the biceps, to which it supplies a kind of gutter. Frequently this muscle is divided into two bundles, the one anterior, the other posterior. 5, the coraco brachialis muscle: its fleshy fibres spring from the coracoid process, 6, from the posterior aspect of the tendon, 7, which is common to it and the short head of the biceps, and from a fibrous partition that separates these two muscles; they terminate on the external surface and borders of a tendon which is inserted, 8, into the internal surface and borders of the humerus, about its middle part. 9, tendon of the pectoralis major, which is inserted at the anterior lip of the bicipital groove. This tendon is composed of two layers, united inferiorly. 10, tendon of the pectoralis minor; 11, tendon of the deltoid; 12, tendon of the long head of the biceps; 13—14, the triceps muscle; 15, extensor carpi radialis longior; 16—17, supinator brevis; 18, tendon of the biceps; 19, flexor sublimis digitorum.

PLATE LIV.

APPARATUS OF LOCOMOTION.—THE MUSCLES.

INTERNAL AND EXTERNAL REGIONS OF THE ARM.

Fig. 1, internal region. Fig. 2, external region.

Fig. 1 and 2, *A*, humerus; *B*, scapulo humeral articulation. Fig, 1, *C*, internal tuberosity of the humerus. Fig. 1 and 2, *D*, olecranon process; *E*, scapula or shoulder blade. *F*, acromion process; *G*, clavicle. Fig. 1, *L*, coracoid process.

Figs. 1 and 2, 1, middle or long portion of the triceps extensor cubiti, a large and fleshy muscle. It is attached, 2, at the inferior part of the glenoid cavity, and at the superior part of the axillary border of the scapula, in a rough depression, by a tendon which divides into two aponeurotic layers; the external of which is very short, but the internal descends to the middle part of the muscle. The fleshy fibres, that arise between these two layers, form a belly, that twists upon itself, and terminates in a broad aponeurosis, 3. Fig. 2, 4, the external part of the triceps arises at, 5—6, from the posterior surface of the humerus, from the external region of that bone and from an intermuscular septum, that separates it from various muscles: 7, extensor carpi radialis longior; 8, supinator longus; 9, brachialis anticus, and 10, deltoid. From these origins the fleshy fibres run obliquely downwards and backwards, and terminate on the anterior face of a very strong aponeurosis which unites with the aponeurosis of the long portion. The more inferior fibres are continuous with the anconeus muscle. Fig. 1, 11—12—13—14, the internal part, much smaller than the external, arises from the posterior surface of the humerus, the internal border of that bone, and to a fibrous septum that separates it from the brachialis anticus, 15—15, and coraco-brachialis, 16—16, muscles. From these origins the fleshy fibres run obliquely downwards, ontwards and inwards, and form many distinct bundles, that go, some directly to the olecranon and synovial capsule of the elbow joint, and others, to the anterior aspect and internal border of the aponeurosis of the long portion. Constituted by the reunion of these three portions, the triceps is inserted into the posterior part of the olecranon by a very thick tendon which sends a large expansion, 17, into the aponeurosis of the fore arm. A synovial bursa facilitates the sliding of this tendon on the superior part of the olecranon. 18, fibrous ring that gives passage to the cubital nerve. 19, 20, short portion of the biceps, which arises from the coracoid process by a tendon, 21, which is common to it and the coraco-brachialis. Fig. 2, 22, long portion of the biceps; 23, insertion of the pectoralis major. Fig. 1, 24, tendon of latissimus dorsi; 25, tendon of subscapularis muscle. Fig. 2, 26—26, supra-spinatus muscle, which is inserted into the superior facette of the greater tuberosity of the humerus; 27, tendon of the supra-spinatus inserted into the middle facette; 28, 28, tendon of the teres minor muscle, which is inserted into the inferior facette and external border of the humerus, immediately beneath the greater tuberosity; 29, the latissimus dorsi and teres major united; 30, muscles of the posterior region of the fore-arm. Fig. 1, 31, ligaments that unite the clavicle to the coronoid process; 32, notch on the superior border of scapula, converted into a foramen by a ligament; 33, supinator longus muscle: 34, pronator radii teres; 35, aponeurotic expansion of the biceps.

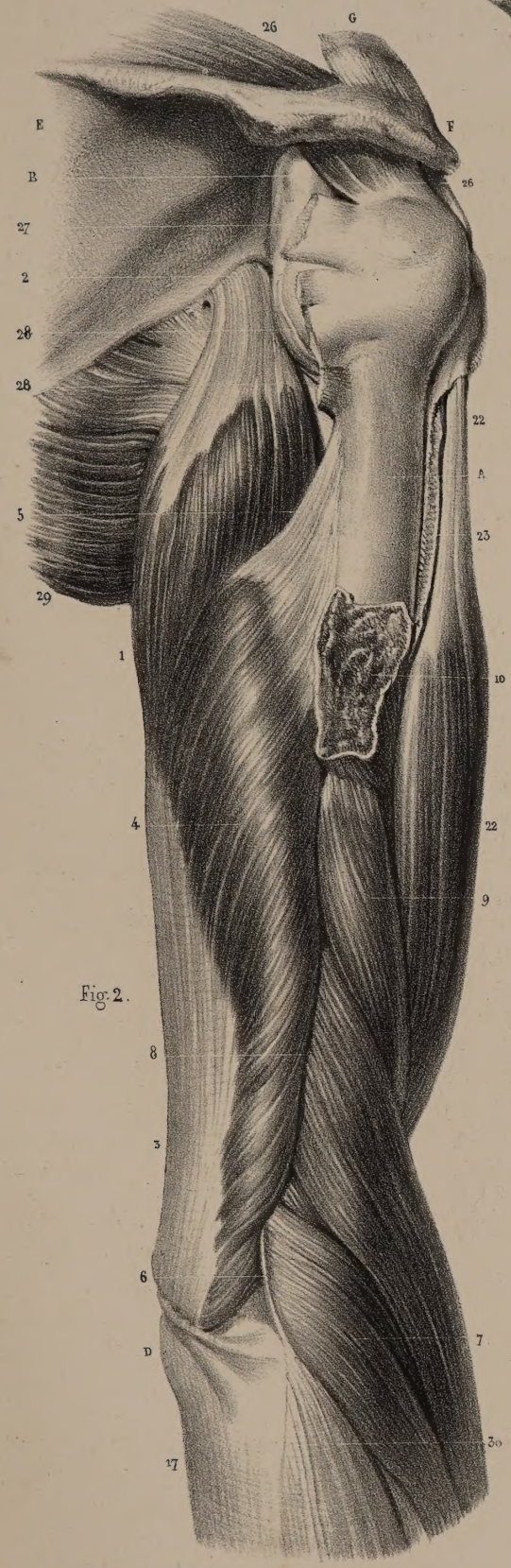

Fig. 2.

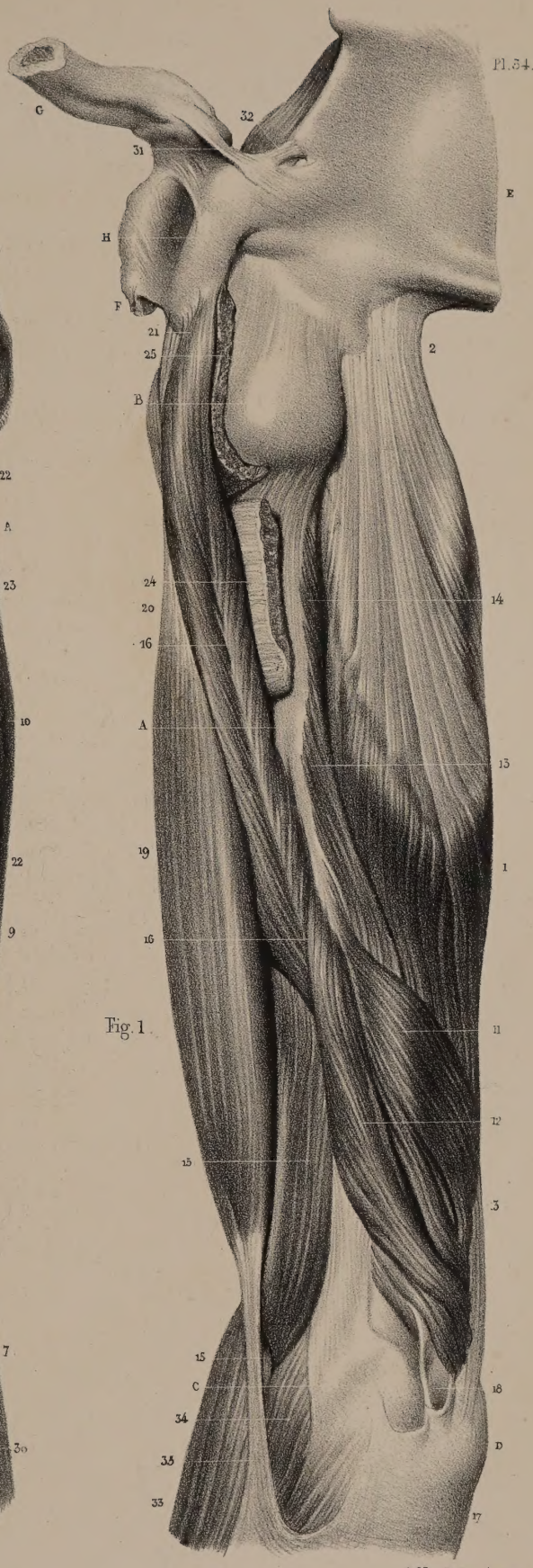

Fig. 1.

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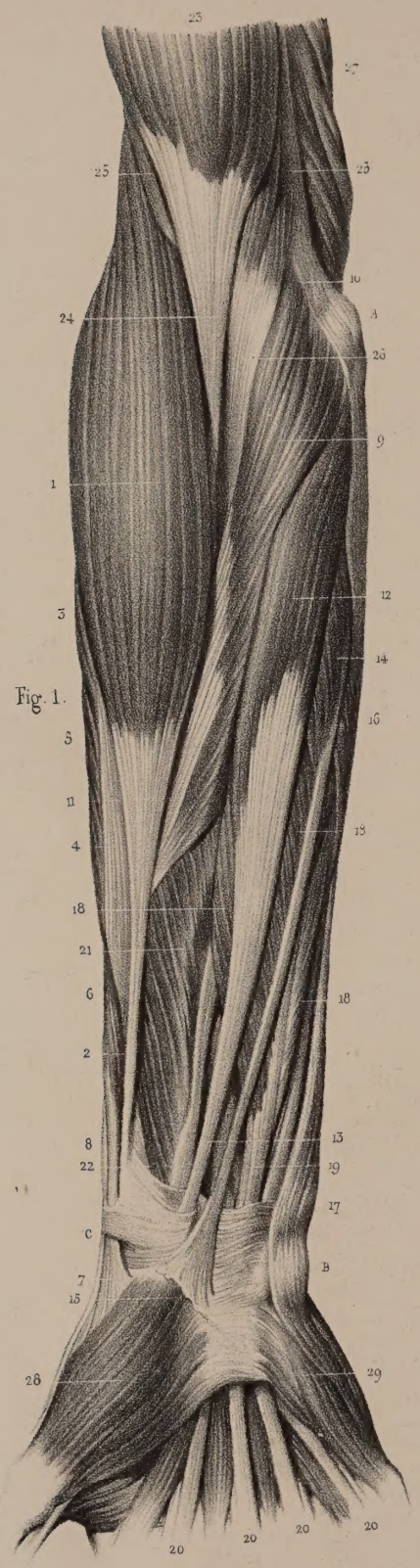
Pl. 55.



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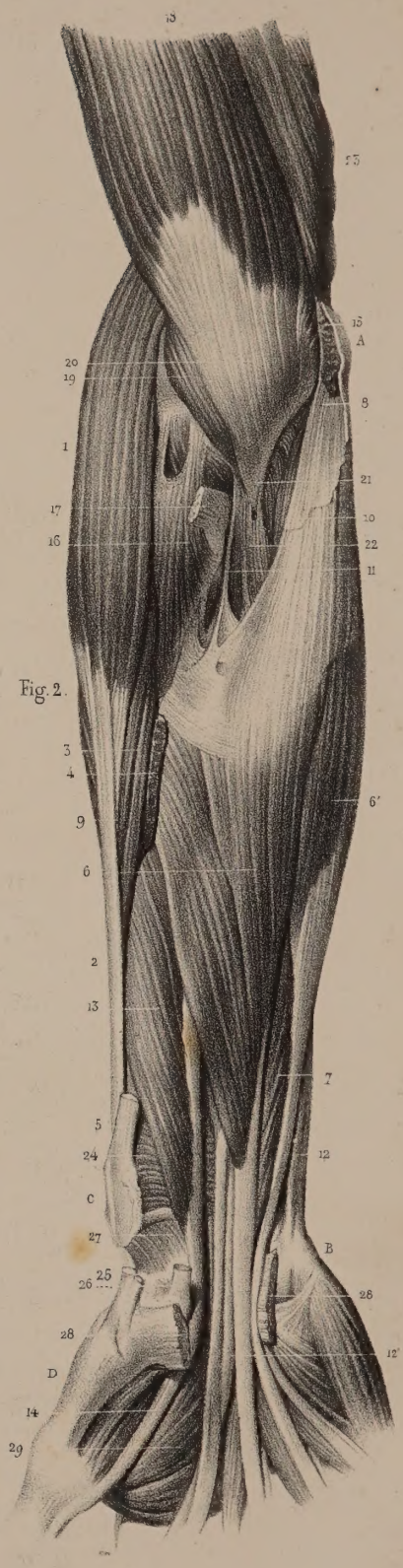

Fig. 2.

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PLATE LV.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ANTERIOR REGION OF THE FORE-ARM.

FIRST LAYER.

Fig. 1. *A*, internal condyle of the humerus; *B*, inferior extremity of the ulna; *C*, inferior extremity of the radius.

1, the supinator radii longus: it arises by fleshy fibres from the external side of the humerus nearly as high as the insertion of the deltoid, and from the intermuscular fascia: about the middle of the fore-arm, the muscle terminates in a flat tendon, which runs along the outer border of the radius and is inserted into the base of the styloid process of that bone; 3—4, the extensor carpi radialis longior; 5, the extensor carpi radialis brevior; 6, the extensor ossis metacarpi pollicis, or abductor longus pollicis; 7, its tendon, which runs through a groove in the inferior extremity of the radius, and is inserted into the head of the first metacarpal bone; 8, the extensor primi internodii, or extensor brevis pollicis; 9, the pronator radii teres; 10, its origin from the lower part of the humerus, and from its internal condyle. It arises, also, from the fascia of the fore-arm, from the intermuscular septa, and from the coronoid process of the ulna by a fleshy slip, which is separated from the rest of the muscle by the median nerve. From these origins, the fleshy fibres converge and are inserted, by a flat tendon, 11, into a rough surface covering the middle of the external aspect of the radius; 12, the flexor carpi radialis, or palmaris major: this muscle arises from the internal condyle of the humerus by a tendon which is common to it, with the pronator teres, palmaris longus, flexor carpi ulnaris, and flexor sublimis: it also arises from the fascia of the fore-arm and from the intermuscular septa that separate it from these muscles: the fleshy fibres are collected round a flat tendon, 13, which grows narrower as it descends to be inserted into the second metacarpal bone; 14, the palmaris longus, or palmaris minor: it arises from the internal condyle by the common tendon, and from the fascia and intermuscular septa of the fore-arm: the fibres unite to form a short and fleshy belly which terminates in a long and thin tendon, 15; 16—17, the extensor carpi ulnaris: 18—18, the flexor sublimis digitorum; 19 and 20—20, tendons of the flexor sublimis; 21—22, the flexor longus pollicis; 23, the biceps; 24, its tendon: 25—25, the brachialis anticus; 26, its tendon; 27, the triceps; 28, muscles forming the ball of the thumb; 29, muscles of the little finger.

SECOND LAYER.

Fig. 2. *A*, internal condyle of the humerus; *B*, inferior extremity of the ulna; *C*, inferior extremity of the radius; *D*, first metacarpal bone.

1, the extensor carpi radialis longior: this muscle arises from the external aspect of the humerus and from the intermuscular fascia, and terminates in a flat tendon, 2, which runs along the outer border of the radius; 3, the extensor carpi radialis brevior; 4, the pronator radii teres, cut off close to its origin; 5, tendon of the supinator longus; 6—6'—7, the flexor sublimis: this muscle arises from the internal condyle by the common tendon, 8, and from the anterior border of the radius, 9, by tendinous fibres: it arises, also, from the fascia that separates it from the muscles of the first layer, from the internal lateral ligament of the elbow-joint, and from a tendinous arch, 10, through which pass the median nerve and the ulnar artery: from these different origins the fleshy fibres unite to form two layers or distinct fleshy bellies: the anterior layer, 6—6', is large and broad, and forms two tendons, the one for the middle, and the other, 12, for the ring-finger; the posterior layer is smaller, and terminates in two tendons, one for the little, and the other for the index finger, 12'; these four tendons pass under the annular ligament of the wrist in company with the tendons of the flexor profundus digitorum and flexor longus pollicis; 13, the flexor longus pollicis: 14, its tendon; 15, the pronator radii teres divided at its origin: 16, the supinator brevis: 17, tendon of the biceps; 18—19—20—21, the brachialis anticus; 22, the flexor profundus digitorum; 23, the triceps; 24, the pronator quadratus; 25, tendon of the extensor ossis metacarpi, or abductor longus pollicis; 26, tendon of the flexor carpi ulnaris; 27, the radio-carpal articulation; 28—28, the annular ligament of the wrist divided at its middle; 29, flexor brevis pollicis.

PLATE LVI.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ANTERIOR REGION OF THE FORE-ARM.

THIRD LAYER.

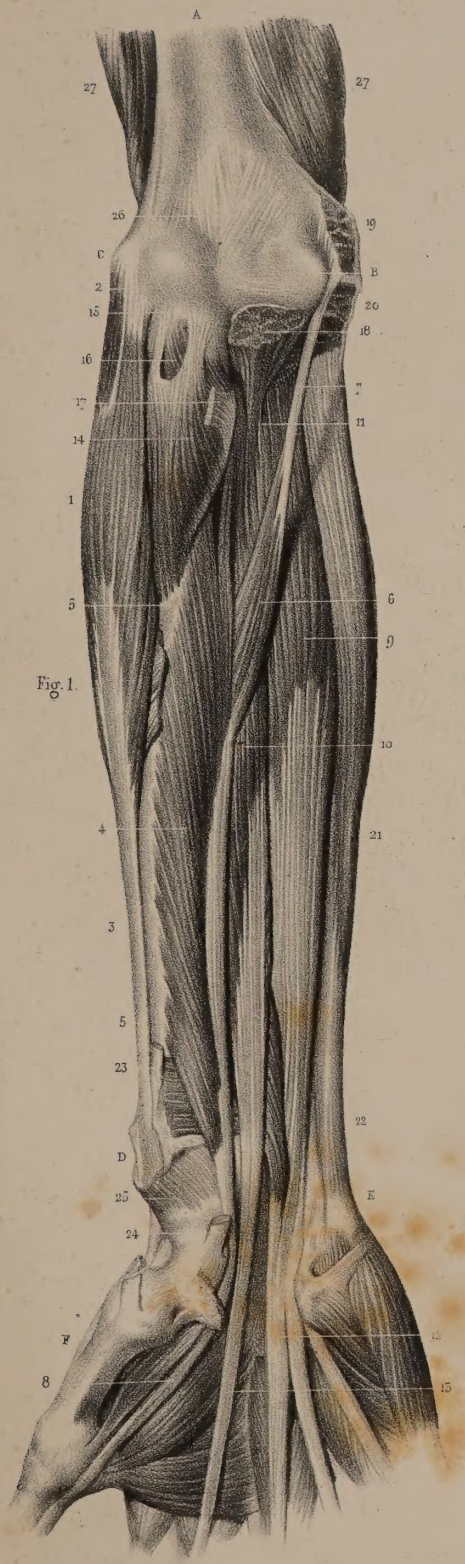
Fig. 1, *A*, inferior extremity of the humerus; *B*, internal condyle; *C*, external condyle; *D*, inferior extremity of the radius; *E*, inferior extremity of the ulna; *F*, first metacarpal bone.

1, the extensor carpi radialis longior; it arises from the external condyle of the humerus by a tendon, 2, which is common to it and the muscles of the posterior region: from the fascia of the fore-arm and the septa of fascia that separate it from the extensor communis digitorum and the supinator brevis: from these different points the fleshy fibres descend and terminate in a tendon, 3, which is at first flat but becomes more narrow and round; 4, the flexor longus pollicis, arising, 5—5, from the anterior surface of the radius, from the interosseous ligament, and by a small fleshy slip, from the coronoid process of the ulna. It also sometimes arises from the internal condyle of the humerus by a slip, 6, which is tendinous at its superior part, 7, and is more or less intimately united to the flexor sublimis: from these origins the fleshy fibres terminate around a tendon, 8, which passes under the annular ligament of the wrist with the tendons of the common flexors; 9—10, the flexor profundus digitorum; this muscle arises from three-fourths of the anterior surface of the ulna, from the fascia of the flexor carpi ulnaris and from the interosseous ligament. Its upper part, 11, arises from the ulna and from each side of the rough surface that gives insertion to the brachialis anticus, and sometimes from the radius, behind and below its tubercle: from these different origins the flexor profundus forms four fleshy bundles which terminate in as many tendons; 12, the tendons distributed to the little, ring, and middle fingers, which are connected by transverse bands; the tendon for the index finger, 13, is separate in its entire length; 14, anterior portion of the supinator brevis, which is inserted, 15, into the annular ligament of the radius: 16, foramen in the fascia for the passage of the radial nerve; 17, tendon of the biceps, which is inserted into the tubercle of the radius; 18, tendon of the brachialis anticus, which is inserted into the rough surface situated immediately below the coronoid process of the ulna; 19—20, common origin of the pronator radii teres, flexor carpi radialis, palmaris longus, and flexor sublimis digitorum; 21—22, the flexor carpi ulnaris; 23, tendon of the supinator longus: 24, tendon of the flexor carpi radialis; 25, radio-carpal articulation; 26, articulation of the ulna with the humerus; 27—27, the triceps.

FOURTH LAYER.

Fig. 2. *A*, inferior extremity of the humerus; *B*, internal condyle: *C*, external condyle; *D*, the radius; *E*, its tubercle; *F*, the ulna; *G*, inferior extremity of the radius; *H*, inferior extremity of the ulna; *I*, first metacarpal bone.

1. Anterior portion of the supinator brevis, which arises by tendinous fibres from the external condyle and the external lateral and anterior ligaments of the elbow-joint, and the annular ligament of the radius: from these origins the fibres curve round the upper end of the radius, and are inserted into the anterior surface of that bone. A small fleshy slip, 3, often covers the anterior half of the annular ligament; 4, the pronator quadratus, this muscle arises from the inferior fourth of the internal border and anterior surface of the ulna: the fibres run transversely outwards and are inserted into the inferior fourth of the external border and anterior surface of the radius; 5, superior portion of the flexor longus pollicis; 6, superior portion of the flexor profundus digitorum: 7, tendon of the brachialis anticus; 8—9—10, the pronator radii teres, flexor carpi radialis, palmaris longus and flexor sublimis, divided at their origin; 11, tendon of the flexor carpi ulnaris; 12, radio-carpal articulation; 13—13, the triceps; 14, interosseous ligament.



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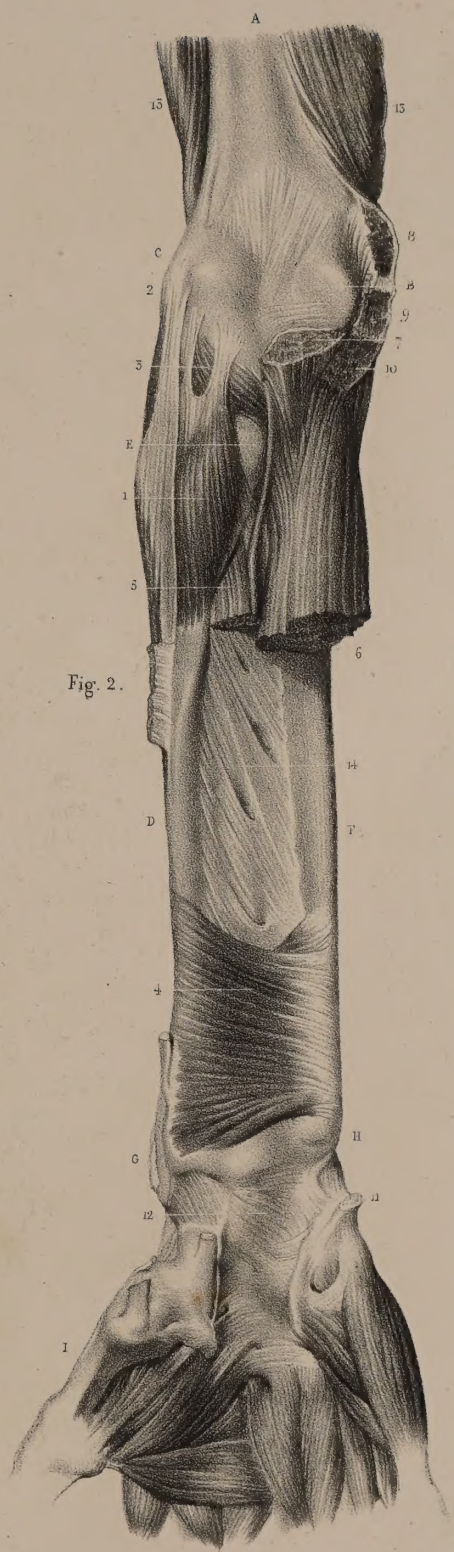

Fig. 2.

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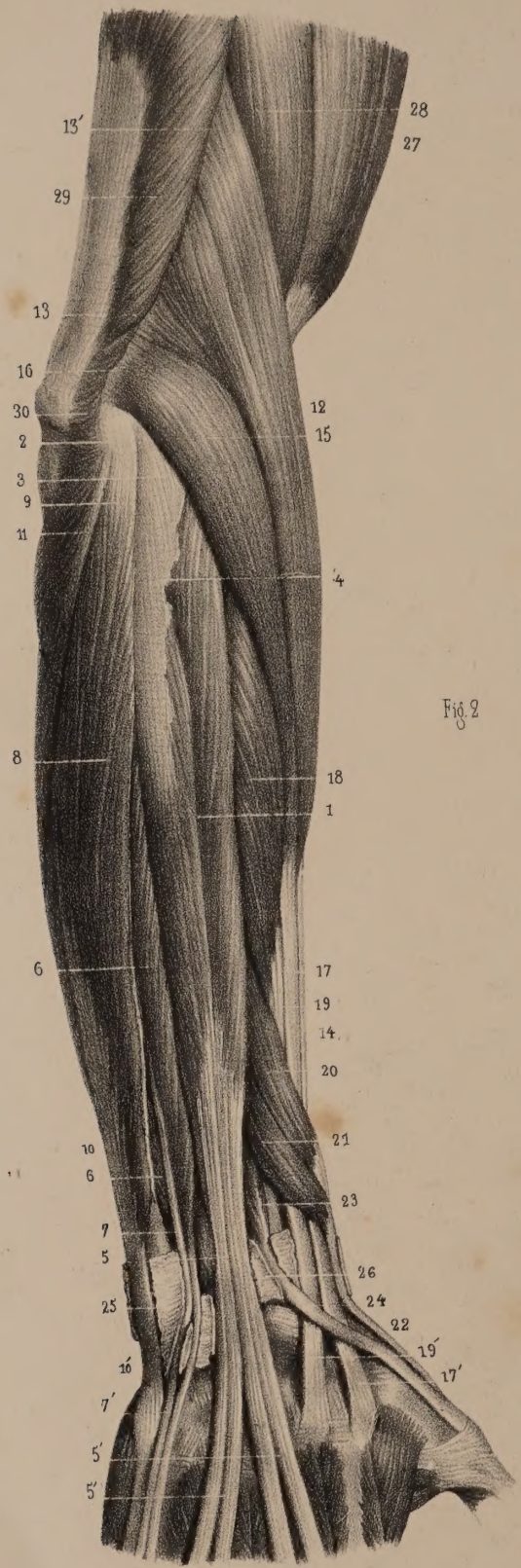

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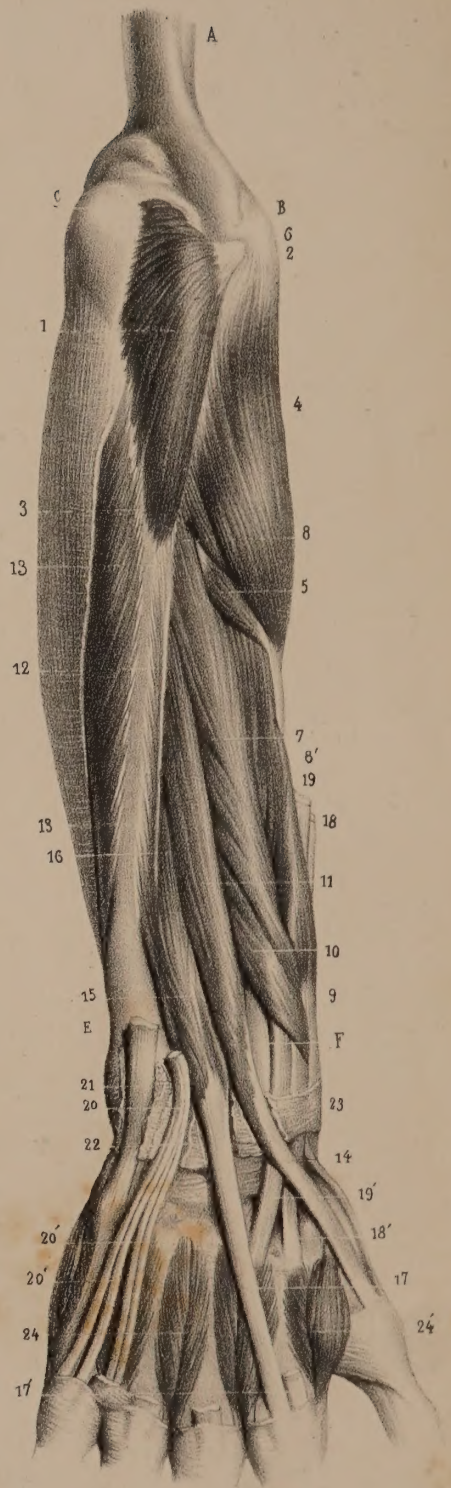

Fig. 2.

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PLATE LVII.

APPARATUS OF LOCOMOTION.—THE MUSCLES.

POSTERIOR REGION OF THE FORE-ARM.

FIRST LAYER.

Fig. 1, 1, extensor communis digitorum; it arises from the external condyle of the humerus, 2, by a tendon, 3, which is common to it and the radial extensors, the extensor proprius minimi digiti and the extensor ulnaris, from the fascia of the fore-arm, 4, and from the fibrous septa which lie between it and the extensor carpi radialis brevior, the extensor carpi ulnaris, the extensor proprius minimi digiti, and the supinator brevis. From these numerous attachments the extensor communis runs perpendicularly downwards, and towards the middle of the fore-arm divides into four fasciculi, each of which ends in a tendon, 5. The four tendons, enveloped in a common synovial sheath, glide under the posterior annular ligament of the carpus within a pulley formed upon the inferior extremity of the radius, then passing along the dorsum of the hand, 5'—5" they proceed to be inserted into the third and fourth phalanges of the four fingers, (See PLATE LXI.) 6, extensor proprius minimi digiti, or auricularis. This muscle, which is not always distinct from the extensor communis, arises from the external condyle by the common tendon, and from the fascia of the fore-arm and surrounding intermuscular septa, and terminating in a tendon, 7—7', divided into two portions, which dips under the posterior annular ligament in a pulley grooved in the head of the ulna, courses along the fifth metacarpal bone, unites with the tendon of the extensor communis, and ends with it on the second and third phalanx of the little finger (See PLATE LXI.) 8, the extensor carpi ulnaris, arising from the outer condyle and from the two upper thirds of the posterior edge of the ulna, from the fascia of the fore-arm and the septum interposed between it and the extensor minimi digiti, terminating in a tendon, 10, which passes under the posterior annular ligament of the wrist in a pulley formed in the head of the ulna, and inserted behind the superior extremity of the head of the fifth metacarpal bone. 11, the anconeus. 12, supinator longus, arising from the outer edge of the humerus, 13—13', it ends in a tendon, 14, which proceeds to be inserted into the base of the styloid process of the radius; 15, extensor carpi radialis longior, arising from the outer edge of the humerus and outer condyle, 16, ends in a tendon, 17, inserted, 17', behind the superior extremity of the second metacarpal bone; 18, extensor carpi radialis brevior, inserted by a tendon, 19—19', behind the upper extremity of the third metacarpal bone; 20, abductor pollicis longus; 21, abductor pollicis brevis; 22, its tendon; 23, extensor longus pollicis; 24, its tendon; 25—26, posterior annular ligament of the carpus, divided variously by fibrous septa which have been laid open; 27, biceps brachialis; 28, brachialis anticus; 29, triceps brachialis; 30, its insertion into the olecranon.

SECOND LAYER.

Fig. 2, *A*, inferior extremity of the humerus; *B*, external condyle; *C*, olecranum; *E*, inferior extremity of the ulna; *F*, inferior extremity of the radius.

1, anconeus, arising by a tendon, 2, from the inferior part of the outer condyle, whence the fleshy fibres proceed radiating to be inserted into the outer aspect of the olecranon and the posterior surface at the upper part of the ulna; 4—5, supinator brevis, arising from the outer condyle and annular ligament of the radius and from the outer margin of the ulna, whence the fleshy fibres proceed bending round the radius to be inserted into the outer and inner aspects of this bone, embracing the bicipital tuberosity; 7, abductor pollicis longus, arising, 8, from the posterior aspect of the ulna, of the interosseous ligament, and of the radius, 8', whence the fleshy fibres proceed to end in a flattened tendon; 9, 10, extensor pollicis brevis, arising from the posterior surface of the radius, ulna and interosseous ligament, and ending in a tendon which unites and is inserted along with that of the abductor longus; 11, extensor primi internodii pollicis arising from the posterior surface of the ulna; 12, the interosseous ligament and a fibrous septum, 13—13, which divides it from the extensor ulnaris, whence the fleshy fibres proceed and gathering around a tendon, 14, which passes under the annular ligament of the carpus in a groove of the inferior extremity of the radius, crosses the tendons of the radial extensors and terminates upon the upper extremity of the second phalanx of the thumb; 15, extensor proprius indicis, which arises from the posterior surface of the ulna, 16, and interosseous ligament, and from a fibrous septum which lies between it and the extensors of the first and second joints of the thumb; the fleshy fibres terminate around a tendon, 17, which enters the pulley of the extensor communis, unites with the tendon, 17', supplied by this muscle to the fore-finger, and is inserted along with it into the first and second phalanx of this digit; 18—18', tendon of the extensor carpi radialis longior; 19—19', tendon of the extensor carpi radialis brevior; 20, tendon of the extensor proprius minimi digiti, divided into four portions, 20'—20'; 21, tendon of the flexor carpi ulnaris; 22—23, posterior annular ligament divided into several sheaths; 24—24', interossei muscles.

PLATE LVIII.

APPARATUS OF LOCOMOTION—THE MUSCLES.

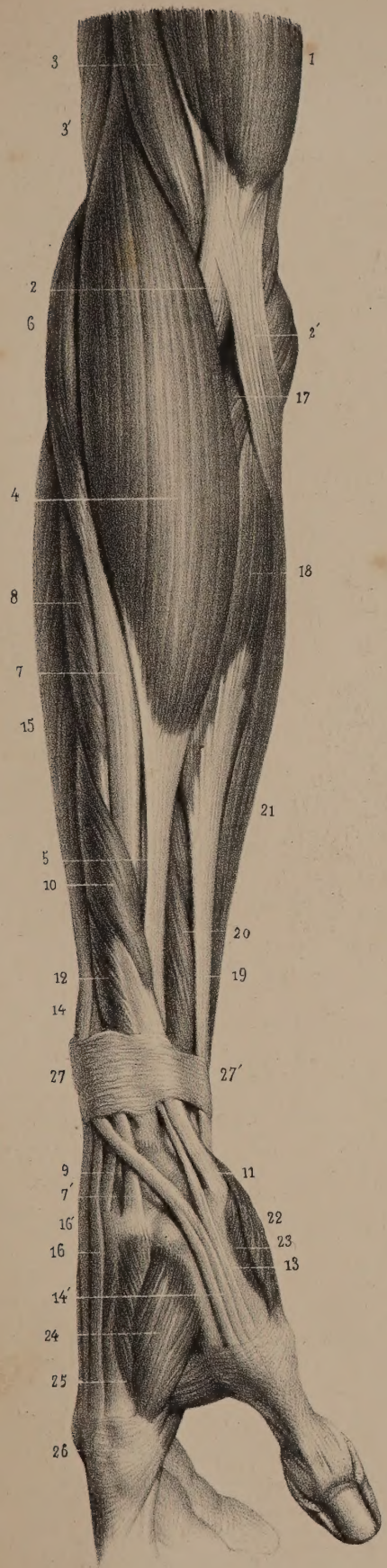
RADIAL REGION.

Fig. 1, 1, biceps brachialis; 2, its direct tendon; 2', its reflected tendon; 3, brachialis anticus muscle; 3', triceps brachialis; 4, supinator longus; 5, its tendon; 6, extensor carpi radialis longior; 7, its tendon, which is inserted, 7', behind the upper extremity of the second metacarpal bone; 8, extensor carpi radialis brevior, which is inserted by its tendon, 9, behind the upper extremity of the third metacarpal bone; 10, adductor pollicis longus; its tendon, 11, crosses the radius and the tendons of the radial extensors, passes into the external pulley of the radius, and is finally inserted into the back part of the upper end of the first metacarpal bone; 12, extensor secundi internodii pollicis, or short extensor of the thumb; this muscle terminates in a slender tendon, 13, which becomes engaged in the same pulley as the tendon of the long abductor, from which it is separated by a fibrous septum; it courses along the dorsal aspect of the first metacarpal bone, and proceeds to be inserted behind the superior extremity of the first phalanx of the thumb; 14—14', tendon of the extensor secundi internodii pollicis, inserted into the superior extremity of the second phalanx of the thumb: this tendon is covered by a fibrous expansion sent off by the short flexor and adductor muscles of the thumb; 15, extensor digitorum communis; 16, tendon supplied by this muscle to the index or fore-finger; 16', tendon of the extensor proprius indicis; 17, pronator radii teres; 18, palmaris longus; 19, its tendon; 20, flexor pollicis longus; 21, flexor digitorum sublimis; 22, abductor pollicis brevis; 23, opponeus pollicis; 24—25, first dorsal interosseous muscle; 26, its tendon; 27, posterior annular ligament of the carpus, continuous with the inferior portion of the aponeurosis, 27', which covers the anterior aspect of the fore-arm.

ULNAR REGION.

Fig. 2, *A*, olecranon; *B*, inner condyle or epitrochlea of the humerus; *C*, inferior extremity of the ulna; *D*, fifth metacarpal bone; *E*, thumb.

1, triceps brachialis. 2, flexor carpi ulnaris, arising, from the inner condyle of the os humeri, 3, from the inner margin of the olecranon, 4, and from the three upper fourths of the posterior edge of the ulna by an aponeurosis, 5—5', which is part of the aponeurosis of the fore-arm. This aponeurosis has been removed to show the fleshy fibres, 6, of the flexor digitorum profundus, which takes its origin from the same posterior edge. The fleshy fibres proceeding from these different points terminate around a tendon of great strength, 7—7, which is finally inserted into the os pisiforme, and by the medium of this bone into the fore part of the upper end of the fifth metacarpal bone; 8, anconeus; 9, extensor carpi ulnaris, which arises from the outer condyle, 10, and posterior edge of the ulna, ends in a tendon, 11, which is inserted at, 12, into the posterior part of the fifth metacarpal bone; 13, extensor digitorum communis; 14, its origin from the external condyle; 15—16, tendon of the extensor proprius minimi digiti, divided into two portions; 16', tendons of the extensor digitorum communis; 17, long abductor and short extensor (extensor secundi internodii pollicis) of the thumb; 18, posterior annular ligament of the carpus; 19, insertion of the fascia of the fore-arm into the posterior edge of the ulna; 20, long and short radial extensors; 21, adductor minimi digiti; 21', its tendon, which terminates on the inner side of the first phalanx of the little finger, by sending an aponeurotic expansion over the flexor tendons of this finger.



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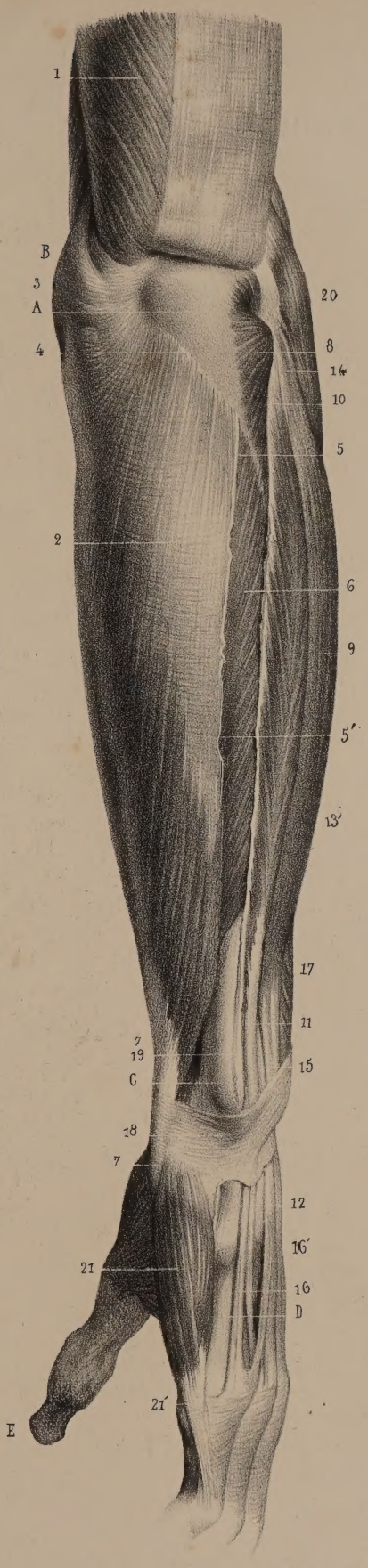

Fig. 2

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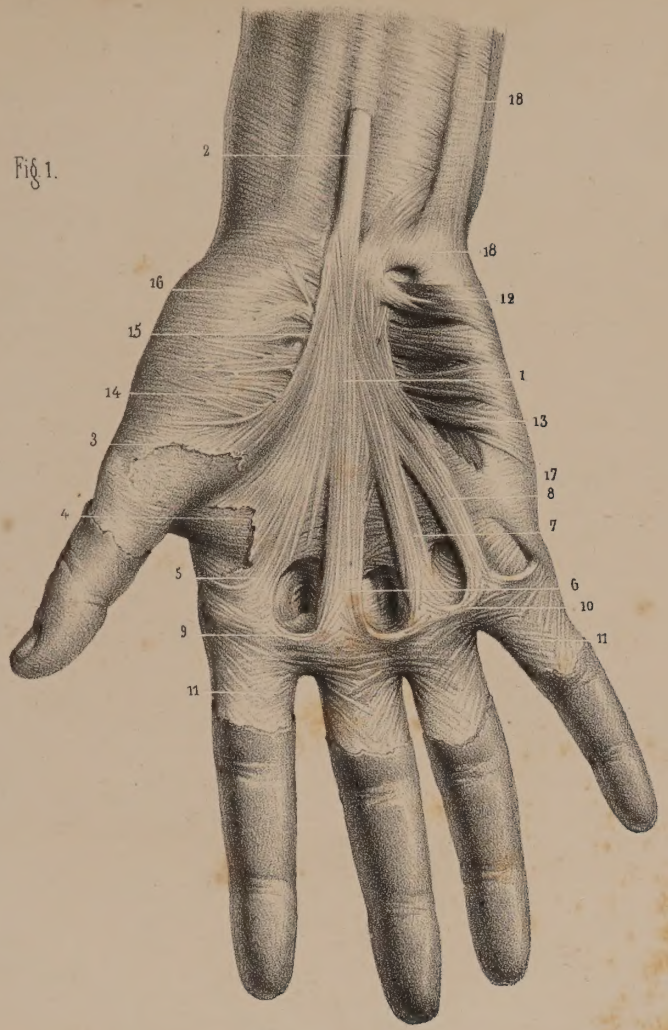

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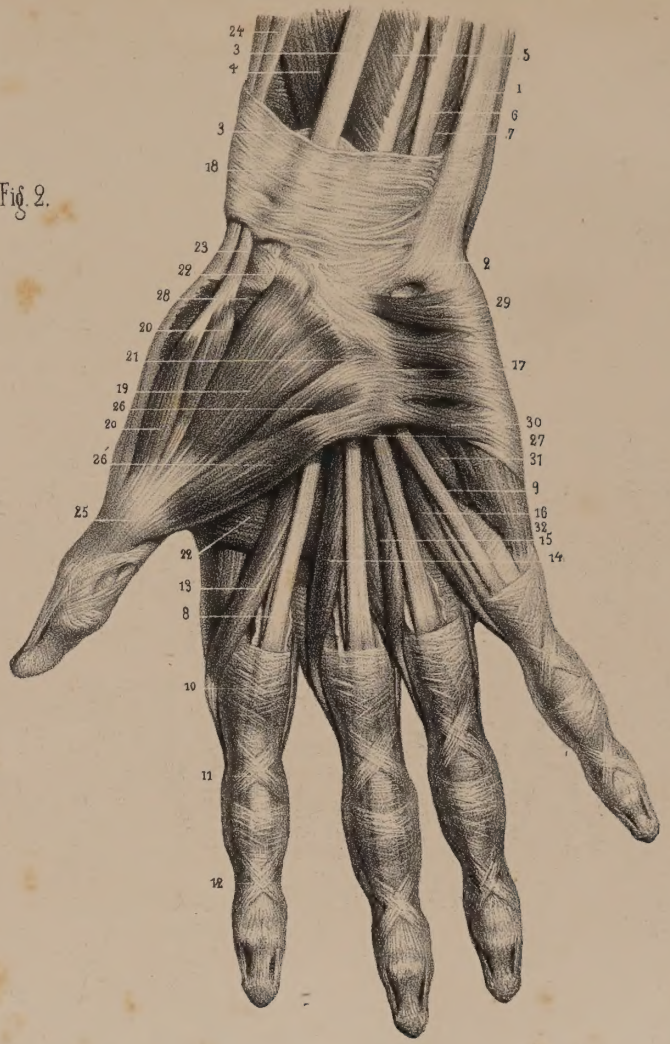

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PLATE LIX.

APPARATUS OF LOCOMOTION.--THE MUSCULAR SYSTEM.

PALMAR REGION.

FIRST LAYER.

Fig. 1, 1, Palmar fascia, arising from the anterior carpal ligament and from the tendon, 2, of the palmaris longus of which it appears to be an expansion. Intimately connected with the skin through its whole extent, the folds and wrinkles of which it determines, the palmar fascia adheres by powerful prolongations to 3—4, the skin, which extends between the thumb and the fore-finger. About the middle of the palm, the component fibres of the fascia divide into four fasciculi, 5, 6, 7, 8, which proceed one to each of the four last digits. The fasciculi, continuous by their superficial layer with the interdigital fibrous tissue, form by their deep layer a kind of channel the edges of which adhere intimately to the inferior metacarpal ligament and to the lateral parts of the first digital phalanges. In this channel, which is a continuation of the fibrous sheath of the fingers, play the tendons of the flexor muscles ; 9, 10, interdigital fibrous substance. This substance, which bears a considerable resemblance to that which envelopes the toes in water birds, unites with the fasciculi of the palmar aponeurosis, and is continued on the lateral and anterior aspects of the fingers, 11, 11. The longitudinal fibres of the palmar aponeurosis are bound down by transverse fibres, 12, 13, 14, 15, 16, 17, which cover the tendons of the flexor muscles and of the *thenar* and *hypothenar* eminences. To these transverse fibres is attached the palmaris brevis muscle, 12, 13. This muscle is composed of several bundles, and arises tendinous from the skin which covers the internal or ulnar aspect of the hand, and ends in an aponeurotic expansion, 14, 15, 16, which extends across and covers the hypothenar eminence; 18, 18, tendon of the flexor ulnaris muscle.

SECOND LAYER.

Fig. 2. 1, 2, tendon of the flexor ulnaris, sending from its inner edge an expansion to the annular ligament of the carpus, and the lower part of the fascia of the fore-arm ; 3, tendon of the palmaris longus 4, flexor longus pollicis ; 5, 6, 7, flexor sublimis digitorum, the four tendons of which, 8—9, after having escaped the anterior annular ligament of the carpus pass over the palm of the hand divergingly, to each of the four last fingers ; lying over the tendons of the flexor digitorum profundus the two sets of tendons enter the channel formed by the palmar aponeurosis together, and then the fibrous sheaths, 10, 11, 12, which convert into canals the grooves which are formed on the anterior aspects of the first and second phalanges of the fingers This sheath, extremely thin at the level of the inter-phalangeal articulations, is composed of super-imposed fibrous rings and cross-slips ; 13, 14, 15, 16, umbrici or lumbricales muscles ; 17, anterior annular ligament of the carpus, continuous with the inferior portion, 18, of the fascia of the fore-arm ; 19, 20, 20, abductor brevis pollicis muscle divided into two fasciculi, the internal arising by tendinous fibres, 21, 22, from the os scaphoides, from the anterior part of the annular ligament, and from the palmar fascia ; the external, 20, 20, arising by an aponeurotic expansion, 23, furnished by the tendon, 24, of the abductor longus pollicis. These two fasciculi unite in a common flattened tendon, 25, which is inserted to the outside of the superior extremity of the first phalanx of the thumb. This tendon, which blends with that of the short flexor muscle, 26—27, sends a tendinous or aponeurotic expansion to the tendon of the long flexor ; 28, opponens pollicis, covered by the abductor brevis ; 29—30, palmaris brevis ; 31, flexor brevis minimi digiti manus; 32, adductor minimi digiti.

PLATE LX.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

PALMAR REGION.

THIRD LAYER.

Fig. 1. 1, tendon of the flexor ulnaris; 2, tendon of the palmaris longus; 3—3, tendon of the adductor longus pollicis, 4—4, flexor sublimis muscle, the four tendons of which, 4', bifurcate, 5—5', towards the middle of the first phalanges to permit the tendons, 6—7—8—9, of the flexor profundus muscle to pass through them; 10, fibrous sheath of the fore-finger laid open; 11, 12, 13, 14, lumbricales muscles; 15, opponens pollicis, arising from the os trapezium, pisiforme and unciforme by tendinous fibres, 16—17, which interlace with those of the flexor brevis and opponens minimi digiti, and are inserted into the tendon, 18, 19, 20, of the abductor longus pollicis and the outer edge of the metacarpal bone of the thumb through its whole extent; 21, flexor brevis pollicis, arising superficially tendinous, from the os trapezium, from the sheath, which incloses the tendon of the palmaris longus and from the apophysis of the os unciforme, 22, where the fibres interlace with those of the flexor brevis and opponens minimi digiti, deeply from the os magnum, inserted by a tendon, 23, into the outer sesamoid bone, and by its intermedium to the first phalanx of the thumb; 24, adductor minimi digiti; arising from the os pisiforme and the tendon of the flexor ulnaris, it runs along the fifth metacarpal bone to be inserted by a tendon, 25, into the inner edge of the first phalanx of the little finger; 26, fibrous band which stretches over the hole that transmits the vessels; 27, opponens minimi digiti; 28, flexor brevis; 29, inferior portion of the fascia of the fore-arm.

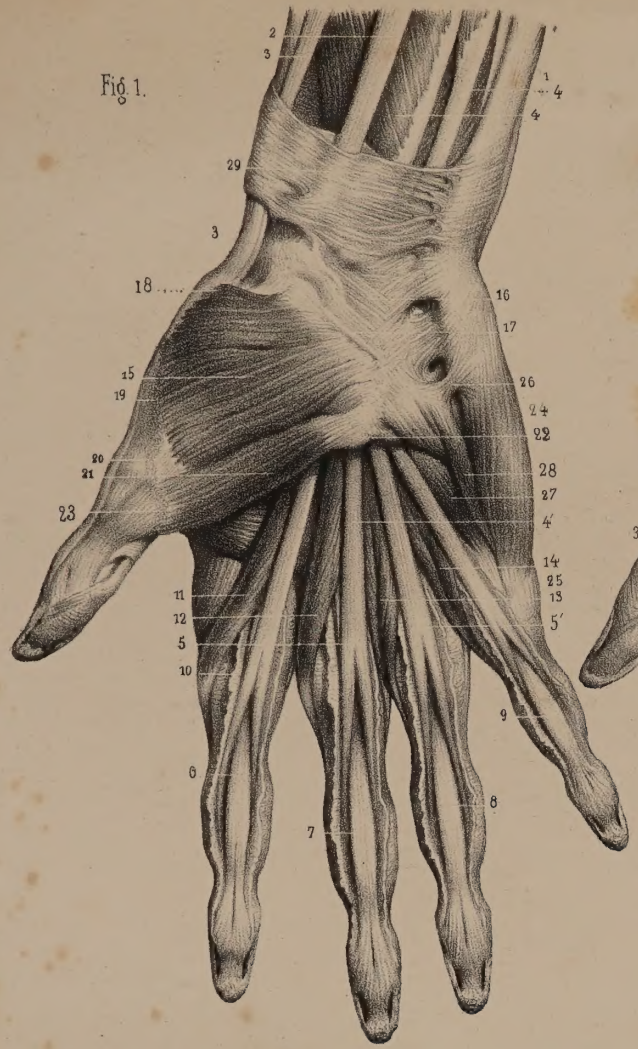
FOURTH LAYER.

Fig. 2. 1, flexor ulnaris; 2, palmaris longus; 3, palmaris brevis; 4—4', flexor digitorum profundus. The four tendons of this muscle, 5, 6, 7, 8, pass under the annular ligament of the carpus behind those of the flexor sublimis, afford origin to the lumbricales, get engaged in the fibrous sheaths of the fingers, pass through the clefts in the corresponding tendons of the flexor sublimis, 9, 10, 11, 12, and then becoming flattened are inserted, 13—14, in front of the base of the third phalanges of the four fingers; 15, 16, 17, the fibrous sheaths of the fingers laid open; 18, 19, 20, and 21, the lumbricales; the first of these muscles, 18, arises from the tendon of the index or fore-finger; the second, 19, from that of the middle finger; the third, 20, from the tendons of the middle and ring fingers; the fourth 21, from those of the ring and little fingers. These small muscles end on the plane of the metacarpo-phalangeal articulations in tendons which unite with those of the corresponding interosseous muscles, and then blend with the tendons of the extensor communis; 22, 23, adductor minimi digiti, divided; 24, flexor brevis minimi digiti, a muscle which does not occur in every subject, its tendon unites with that of the adductor; 26, opponens minimi digiti, arising from 27, the os unciforme, scaphoides and trapezium; 28, transverse fibres between the hooked process of the os unciforme and the os scaphoides and os trapezium. These fibres, which are very strong, form the deep layer of the anterior annular ligament of the carpus, the superficial layer being composed of the interlaced fibres of the opponens and flexor brevis pollicis and little finger; 29, insertion of the opponens pollicis to the outer edge of the first metacarpal bone; 30, insertion of the flexor brevis pollicis to the external sesamoid bone, 31—34, tendon of the flexor longus pollicis which enters a fibrous sheath similar to that which incloses the flexor tendons of the other fingers; 32, adductor pollicis; 33, expansion furnished by the tendon of the long abductor of the thumb; 34, inferior portion of the fascia of the fore-arm; 35, articulation of the first metacarpal bone with the os trapezium.

FIFTH LAYER.

Fig. 3, adductor pollicis, arising from the anterior aspect of the third metacarpal bone, the trapezium, and os magnum conjointly with the deep portion, 3—4, of the short flexor of the thumb. From these different origins the fleshy fibres unite into two converging bundles which end in a tendon, 5, that is implanted into the internal sesamoid bone, and by its intermedium into the first phalanx of the thumb; 6, tendon of the flexor longus pollicis inserted into the anterior aspect of the last phalanx of th e thumb; 7, sheath of this tendon laid open; 8—9, opponens minimi digiti; 10—11—12—13—14, interossei muscles; 15—16—16', grooves for the tendons of the flexor sublimis digitorum; 17—18—19—20, tendons of this muscle; these tendons divide into two principal slips which bend in upon one another and interlace at the bottoms of the grooves, 21—21, opposite the articulations of the first with the second phalanges; 22—23,—24—25, tendons of the flexor profundus; 26, wrist joint; 27, pronator quadratus; 28, tendon of the abductor longus pollicis; 29—30, anterior annular ligament of the carpus divided; 31, articulation of the metacarpal of the thumb with the trapezium; 32, tendon of the palmaris longus; 33, tendon of the flexor ulnaris; 34, insertion of the adductor minimi digiti.

Fig. 1.



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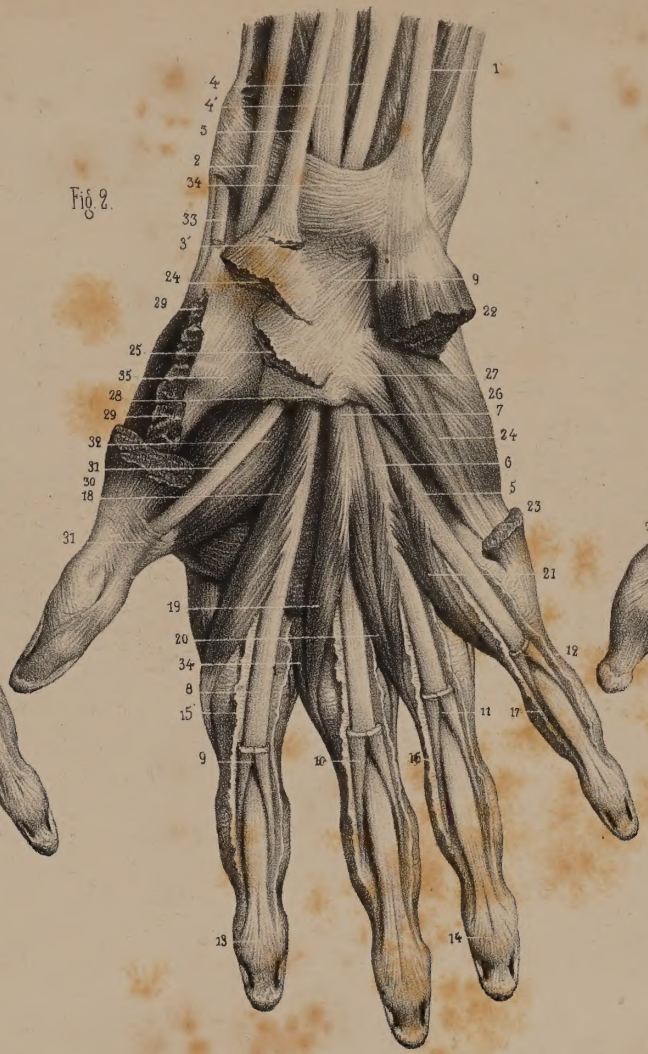

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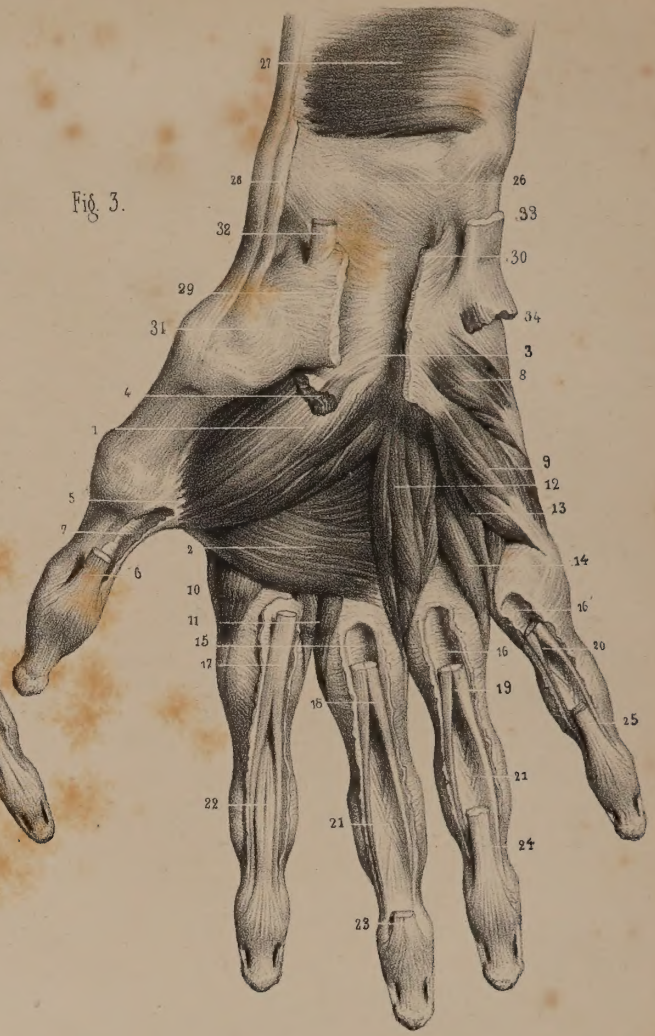

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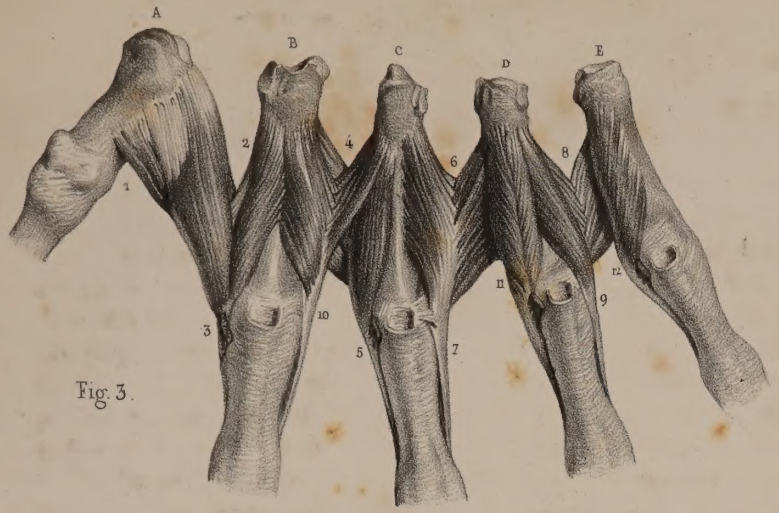

Fig. 3.

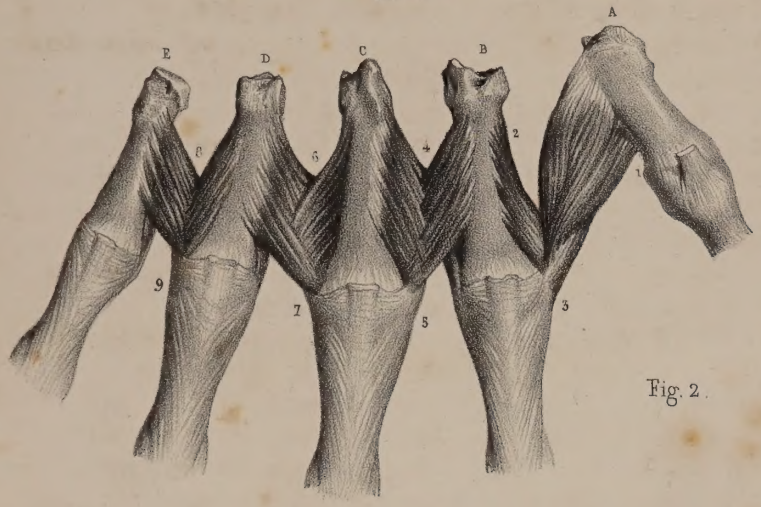

Fig. 2.

Fig. 1.

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PLATE LXI.

APPARATUS OF LOCOMOTION—MYOLOGY.

DORSAL REGION OF THE HAND.

Fig. 1. *A*, inferior extremity of the radius; *B*, of the ulna; *C*, metacarpal bone of the fore finger.

1—2, united tendons of the extensor communis digitorum, extensor proprius minimi digiti, and extensor proprius indicis. The four tendons of the common extensor, 3—4—5—6, after having passed under the annular ligament of the carpus, 7, proceed along the back of the hand, diverging, towards the lower ends of the metacarpal bones. The tendons of the little, ring, and middle fingers, broadened or flattened, and generally divided into several fasciculi, are connected by means of aponeurotic bands of various strength, 8—9; the tendon of the index finger, of less breadth than those of the other fingers, is connected with the tendon of the middle finger by a very delicate aponeurotic expansion, 10. A little above the metacarpo-phalangeal articulations, these four tendons contract and become thicker, but immediately enlarge again upon the dorsal aspects of the first phalanges after having received the tendons of the lumbricales and interossei, 11—12—13, which envelope them in a kind of sheath. Opposite the articulations between the first and second phalanges the tendons divide into three portions: a middle portion, 14, which is inserted into the upper extremity of the second phalanx; two lateral portions, 15—15, which separate, course along either side of the articulation, and unite again on the dorsum of the second phalanges to be finally inserted into the upper extremity of the third phalanges; 16, tendon of the extensor proprius minimi digiti; 17—17, tendon of the extensor proprius indicis; this tendon and the last terminate in the same way as the tendons of the extensor communis; 18—19, first dorsal interosseus muscle; the other interossei, 20—21—22, are covered by the tendons of the extensor radialis brevior, inserted into the upper end of the third metacarpal bone; 25, tendon of the extensor radialis longior inserted into the upper end of the second metacarpal bone; 26, tendon of the extensor longus pollicis; 27, tendon of the extensor brevis pollicis.

INTEROSSEOUS REGION.

Figs. 2, 3. *A*, *B*, *C*, *D*, *E*, the superior extremities of the five metacarpal bones.

The interossei muscles are seven in number, and are distinguished into dorsal and palmar; the dorsal interossei are four in number: 1—2—3, the first dorsal interosseus; 4—5, the second; 6—7, the third; and 8—9, the fourth. These muscles are severally formed of two fasciculi, one of which arises from the posterior part of the lateral aspect of one of the metacarpal bones, and the other from the entire extent of the corresponding lateral aspect of the metacarpal bone next or opposite to the former one; from this two-fold origin the fleshy fibres interlock and unite around a tendon which is inserted into the upper end of the first phalanx and into the tendon of the extensor digitorum communis.

Fig. 3, the palmar interossei are three in number: 10—11—12. These muscles consist of single fasciculi extending from their origins along the lateral and palmer aspects of the metacarpals, to their insertions into the first phalanx of each corresponding finger and the tendon of the extensor communis.

To form a correct idea of the disposition of these muscles it is necessary to view them in connexion with the motions of adduction and ab-

duction which they impress upon the fingers, these motions being regarded with reference to the axis of the hand. The axis of the hand being represented by a line passing through the middle finger, all the dorsal interossei are abductors, all the palmar interossei adductors with reference to this line. Thus the first dorsal interosseus, 1—2—3, is plainly the abductor of the fore finger; the second dorsal interosseus, 4—5, is as obviously the abductor of the middle finger; in the same manner is the third dorsal interosseus arising from the metacarpal bone of the ring finger and the corresponding aspect of the metacarpal of the middle finger the abductor of this finger; the abducting action of the fourth interosseus is indubitable from the arrangement of its fibres between the points of greater and of less fixity.

The palmar interossei, again, (Fig. 3.) are all adductors with reference to the axis indicated: the first palmar interosseus for examples, 10, extending from the metacarpal of the second finger to the first phalanx of the index, is an adductor of this finger; the second palmar interosseus, 11, in like manner, stretching from the fourth metacarpal to the outer edge of the corresponding ring finger mnst act as an adductor,; and so of the third palmar interosseus: having its origin from the lateral aspect of the fifth metacarpal bone and being inserted into the outer edge of the first phalanx of the little finger, it acts by bringing this finger towards the axis of the hand, and therefore as an adductor.

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PLATE LXII.

APPARATUS OF LOCOMOTION.—MYOLOGY.

PELVI-FEMORAL REGION; POSTERIOR ASPECT.

FIRST LAYER.

A, spinous processes of the lumbar vertebræ; *B*, os coccygis; *C*, crest of the ilium; *D*, trochanter major.

1, gluteus maximus, 2, its upper, and 3, its lower margin; 4—4, origins of this muscle from the outer lip of the crista ilii, from the linea semicircularis postica and the roughness situated behind this line; from the sacral ridge and tubercles that succeed the spines of the lumbar vertebræ; from the posterior part of the coccyx and great sacro-sciatic ligament. The origins from the sacrum and coccyx are tendinous and intimately connected with the aponeurosis affording common origin to the posterior muscles of the spine. Many of the tendinous fasciculi, 5—6—7—8, interlace with corresponding bundles of the opposite muscle, having crossed the mesial line, 9, and become continuous with the aponeurosis of the latissimus dorsi. From the different origins indicated the fleshy fibres of the gluteus maximus, collected into distinct and parallel fasciculi, proceed towards a strong tendon, 10—10, which is inserted into the branch of the superior bifurcation of the linea aspera femoris and into the upper part of this line, between the third adductor and the vastus externus, with which it is connected by means of a fibrous bundle of great strength. The tendon of the gluteus maximus sends off a broad aponeurotic expansion, 11, from its outer surface, which must be regarded as one of the principal origins of the femoral aponeurosis, 12—12; 13—13, insertions of the gluteus maximus directly into the fascia lata femoris; 14, the cut edge of this fascia which has been almost entirely removed; 15—15, outer portion of the triceps femoris muscle and vastus externus; 16—16, gluteus medius, covered by the part of the fascia femoris which supplies attachment to its fleshy fibres; 17, biceps femoris; 18, semitendinosus; 19, semimembranosus; 20, adductor tertius; 21, gracilis, or rectus internus femoris

PLATE LXIII.

APPARATUS OF LOCOMOTION—MYOLOGY.

PELVI-FEMORAL REGION; LATERAL ASPECT.

FIRST LAYER.

A, crest of the ilium; *B*, anterior and superior spinous process of the ilium; *C*, trochanter major.

1, gluteus maximus; 2, its upper margin; 3, its lower margin; 4—4, its tendon intimately connected with the femoral fascia; 5—5, 6—6, femoral fascia, the very considerable thickness of which in this region is due to the strong aponeurotic fasciculi which come from the crest of the ilium and the tendon of the gluteus maximus. The femoral fascia in this figure is almost entirely taken away. 7—8—9, gluteus medius covered by that portion of the femoral fascia which serves for the attachment of some of its fleshy fibres; 10, anterior edge of the gluteus medius, intimately connected in its upper half with the tensor vaginæ femoris; 11, tendon of the gluteus medius, inserted into the outer surface of the trochanter major; 12, tensor vaginæ femoris; 13, its origin from the anterior part of the outer lip of the crista ilii and anterior superior spinous process of the same bone, between the gluteus medius and the sartorius. This muscle covered by a thin slip of the fascia lata femoris enlarges as it descends and ends at 14, in 15 the fascia lata femoris; 16, sartorius; 17—17—17, vastus externus; 18, biceps femoris; 19, semi-tendinosus; 20—20, obliquus externus abdominis; 21—21, anterior abdominal aponeurosis; 22, latissimus dorsi; 23, posterior abdominal aponeurosis.

Pl. 63

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PLATE LXIV.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

COXO-FEMORAL REGION.

SECOND LAYER.

A, Crest of the ilium; *B*, posterior superior spinous process; *C*, fifth lumbar vertebra; *D*, os coccygis, *E*, symphysis pubis; *F*, tuber ischii: *G*, spine of the ischium; *H*, trochanter major.

1—2, the gluteus medius, arising from that part of the external aspect of the ilium which is comprised between the two semilunar lines, from the anterior superior spinous process, from the outer edge of the whole of the crest and from the lower surface of a thick fascia, 3, which is continuous with the fascia of the thigh; from these origins the fleshy fibres converge and descend to the trochanter major. The anterior and middle fibres run obliquely from before backwards and form a thick fasciculus, 1, which is in contact by its anterior border with the tensor vaginæ femoris, and by its anterior surface with the gluteus minimus; the posterior fibres run obliquely from behind forwards, and form a flat mass which is situated in front of the latter; these two unite and form a strong tendon, 4, which is inserted into the external surface and superior border of the trochanter major: some of the fibres of the posterior fasciculus join the tendon of the pyramidalis; 5, foramen for the passage of the gluteal vessels; 6, the pyriformis or pyramidalis: this muscle makes its exit from the pelvis through the superior sacro-sciatic notch and lies between the gluteus medius and gemellus superior; 7—8, the obturator internus; this muscle passes out of the pelvis by the inferior sacro-sciatic notch and lies between the two gemelli; 9—10, the two gemelli: the gemellus superior, 9, arises from the spine of the ischium and from part of the lesser sciatic notch: the gemellus inferior, 10, which is the largest, arises from the posterior and superior part of the tuber ischii and the superior surface of the great sacro-sciatic ligament: they both then terminate round the tendon of the obturator internus, a few fibres of the inferior gemellus being inserted into the capsular ligament of the hip-joint; 11, the quadratus femoris; 12—13, tendon of the gluteus maximus; 14, part of the adductor magnus; 15, foramen for the passage of vessels; 16, the vastus externus; 17, the semi-tendinosus, which arises from the tuber ischii by a tendon which is common to it and the long head of the biceps; 18, the long head of the biceps; 19, tendon of the semi-membranosus; 20, flat fleshy part of this muscle, lying between the gracilis and the semi-tendinosus; 21, part of the adductor magnus, lying between the semi-tendinosus and the gracilis; 22, the gracilis; 23—24—25, great sacro-sciatic ligament; 26, posterior sacro-iliac ligament; 27, ligamentous fibres; 28, ilio-lumbar ligament.

PLATE LXV.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

COXO-FEMORAL REGION.

THIRD LAYER.

Fig. 1. *A*, crest of the ilium; *B*, sacrum; *C*, os coccygis; *D*, superior sacro-sciatic foramen; *E*, inferior sacro-sciatic foramen; *F*, trochanter major.

1, the gluteus minimus; it arises, 2, from the anterior part of the crista ilii, 3—4, from that portion of the external aspect of the ilium, which is below the anterior curved line, and 5, from the edge of the greater sacro-sciatic notch: the fibres are radiated in their direction and converge to terminate on the posterior surface of a tendon which is inserted, 6, into the external surface and anterior border of the great trochanter; 7, the pyriformis, cut off close to its origin; 8, its tendon which is inserted into the upper border of the great trochanter; 9, the obturator internus and the two gemelli; 10, the great sacro-sciatic ligament; 11, the lesser sacro-sciatic ligament; 12, the quadratus femoris; 13—14—15—16, aponeurosis of the vastus externus; 17, fleshy fibres arising from it; 18, part of the adductor magnus; 19, the semimembranosus; 20, tendons of the biceps and semitendinosus; 21, the rectus.

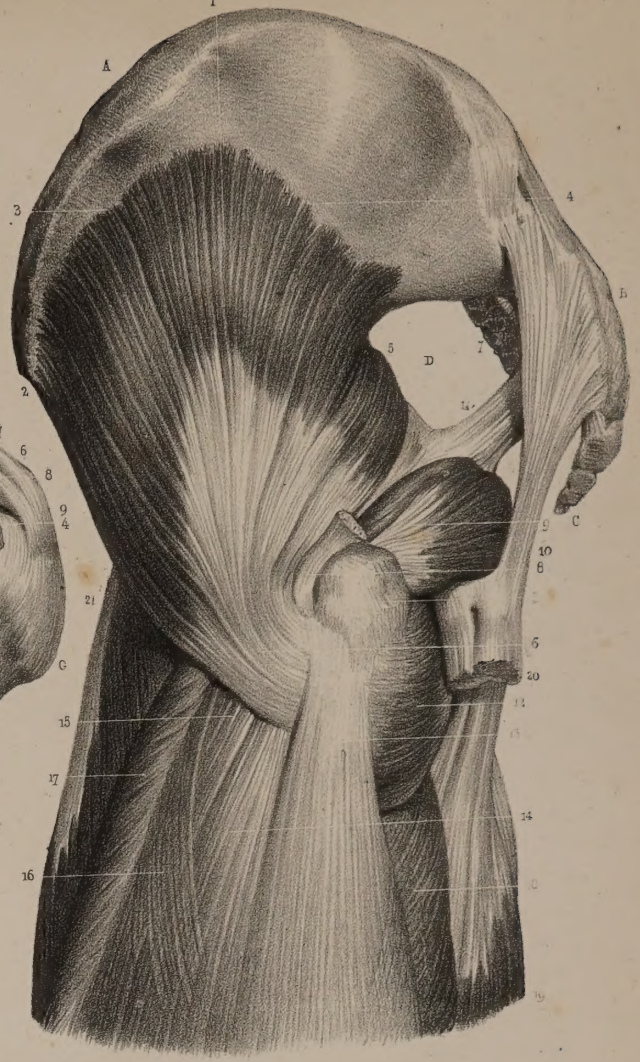
Fig. 2, *A*, anterior superior spinous process of the ilium; *B*, symphysis pubis; *C*, tuber ischii; *D*, acetabulum; *E*, the femur; *F*, section of its neck at its base; *G*, the great trochanter.

1, the obturator externus, arising, 2—3, from the anterior surface of the pubis and its descending ramus, and from the ascending ramus of the ischium and the obturator membrane: from these origins the fibres converge and unite to form a round muscle which lies in a groove below the acetabulum, and after winding round the neck of the femur, is inserted by a tendon, 4, into the digital fossa of the great trochanter; 5, foramen thyroideum; 6, tendon of the obturator internus: this tendon, in which terminate the fleshy fibres of the two gemelli, 7, 8, is inserted into the superior border of the great trochanter; 9—9, tendon of the pyriformis, which is inserted into the superior border of the trochanter; 10, the psoas magnus; 11, the iliacus internus; 12, fibres of the iliacus that arise from the tendon of the rectus, 13.

Fig. 3, *A*, fourth lumbar vertebra; *B*, promontory of the sacrum; *C*, first vertebra of the sacrum; *D*, anterior sacral foramen; *E*, os coccygis; *F*, symphysis pubis; *G*, tuber ischii; *H*, crista ilii.

1, The pyriformis, arising, by three or four digitations from the anterior surface of the sacrum and from the grooves external to the sacral foramina; it also arises from the upper surface of the great sacro-sciatic ligament and from the border of the greater sciatic notch, and passes out of the pelvis through the superior sciatic notch (see 6, Plate LXIV); 2—3—4, the obturator internus, arising from the posterior surface of the pubis and its descending ramus, from the ascending ramus of the ischium, from part of the greater sciatic ligament, from the posterior surface of the thyroid membrane, from the whole space between the thyroid foramen and the sciatic notch, and by some of its fibres from the ilio-pectineal line, the fleshy fibres unite to form a narrow muscle, 6, which passes out of the pelvis through the inferior sacro-sciatic notch (see 7, Plate LXIV); 5, foramen thyroideum; 7, greater sacro-sciatic ligament: this ligament is attached to the internal edge of the tuberosity and ascending ramus of the ischium, by a falciform process, which gives origin to the fibres of the obturator internus; 9, lesser sacro-sciatic ligament; 10, the psoas magnus; 11, internal part of the iliacus internus, which passes round the psoas to its insertion at the inner border of its tendon; 12, external portion of the iliacus.

Fig. 1.



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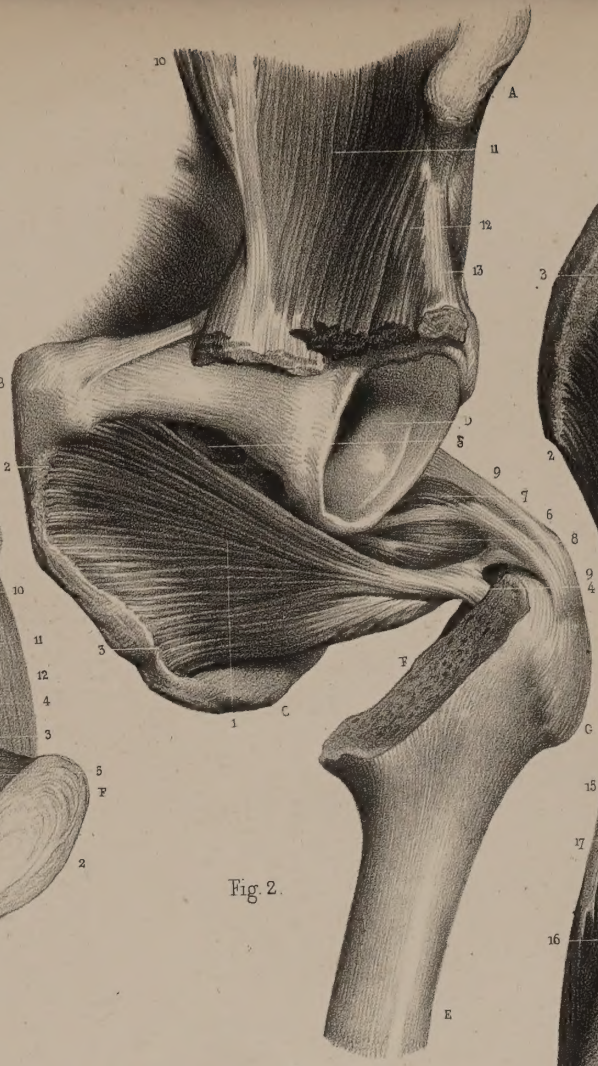

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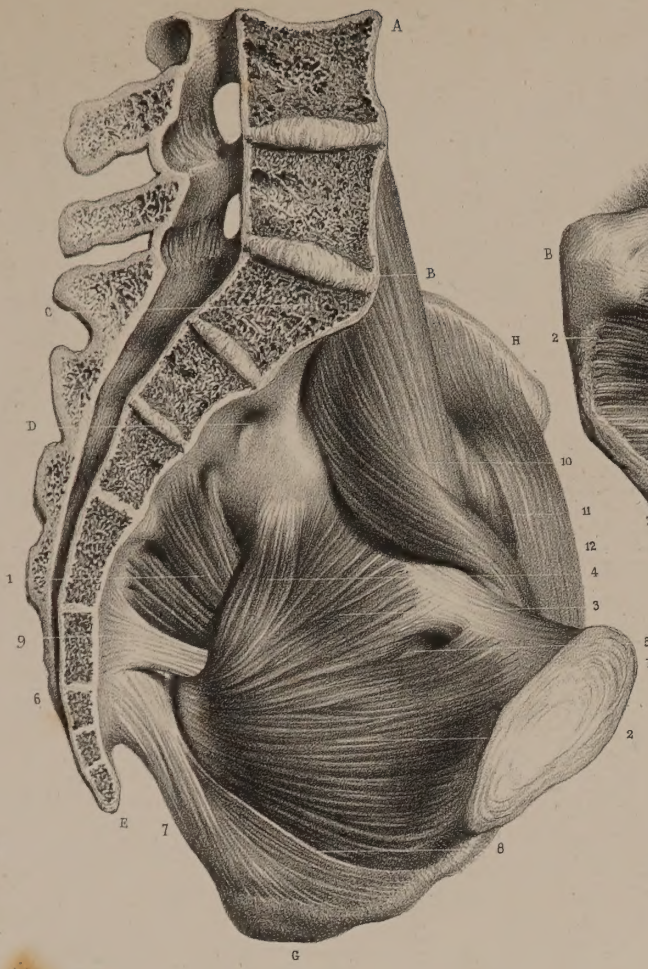

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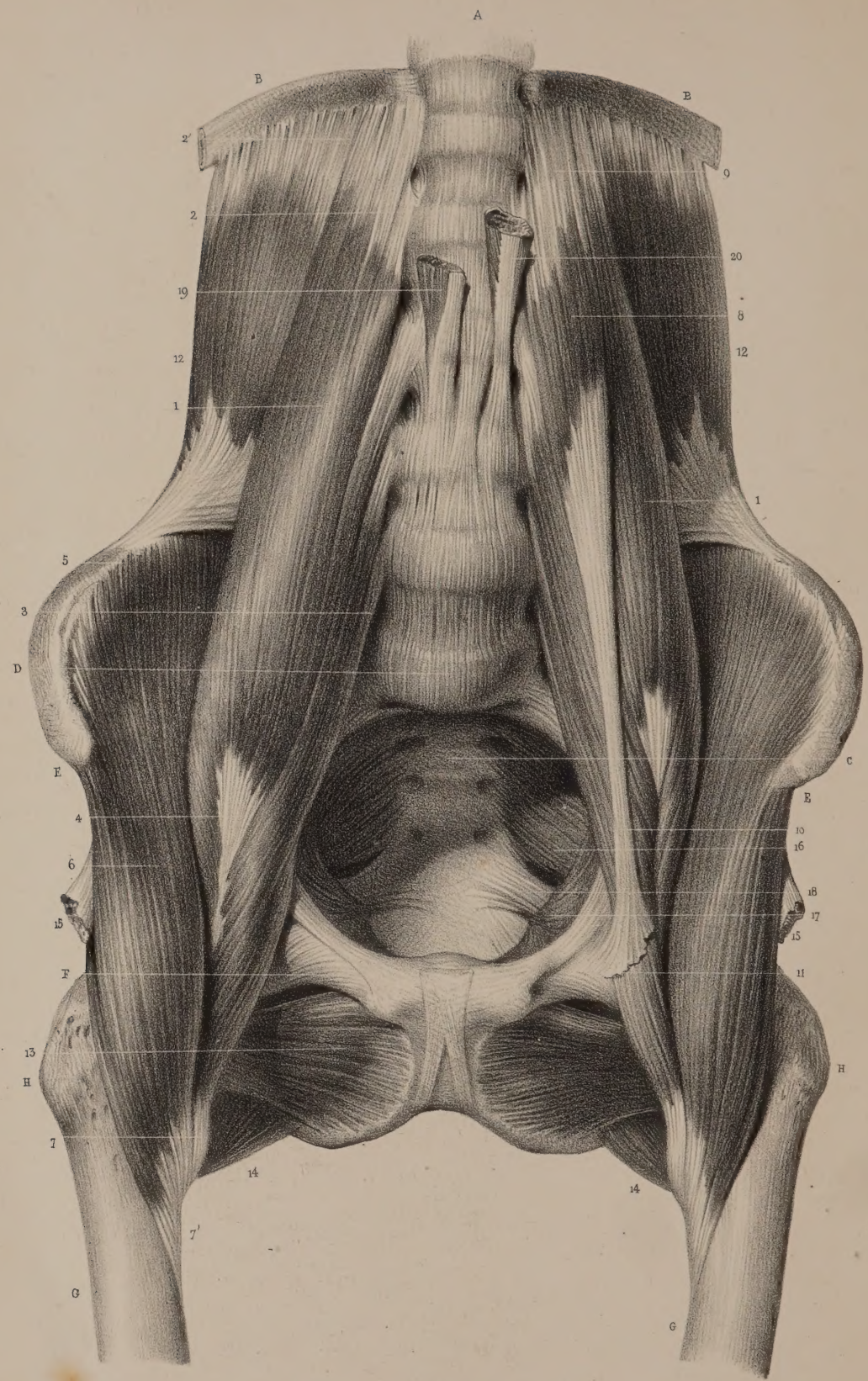

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PLATE LXVI.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

LUMBAR REGION.

A, Twelfth dorsal vertebra; *B*, twelfth rib; *C*, anterior aspect of the sacrum; *D*, promontory of the sacrum; *E*, anterior superior spinous process of the ilium; *F*, os pubis; *G*, the femur; *H*, trochanter major.

1, the psoas magnus: this muscle arise, 2—3, from the sides of the bodies of the twelfth dorsal, and five lumbar vertebræ, by tendinous bands which are attached to the superior and inferior borders of the bodies of the vertebræ and to the invertebral substance: between these bands pass the lumbar vessels and nerves: it also arises by some flat fasciculi from the base of the transverse processes of the four lower lumbar vertebræ, and occasionally, 2', from the lower border of the twelfth rib: the fleshy fibres unite to form a muscle which is at first flat, but afterwards becomes more rounded, which passes along the brim of the pelvis, thus diminishing its transverse diameter, and terminates in a strong tendon, 4, which receives along its external border the greater part of the fibres of the iliacus, and along its internal border, receives the most internal fibres of the same muscle, which form a separate mass (see 11, fig. 3, Plate LXV); 5—6, the iliacus; it arises from the iliac fossa, from the inner edge of the crista ilii, from the base of the sacrum, the ilio-lumbar ligament, the anterior superior and anterior inferior spinous processes of the ilium and the intervening notch, from the tendon of the rectus and from the capsular ligament of the hip-joint: the fleshy fibres converge to terminate round the tendon of the psoas, 4, which passes out of the pelvis between the anterior inferior spinous process of the ilium and the ilio pectineal eminence, glides over the capsular ligament of the hip, and is inserted, 7, into the trochanter minor: the anterior portion of the iliacus, which often forms a distinct muscle, is inserted separately, 7', into the oblique line which runs from the trochanter minor to the linea aspera; 8, the psoas parvus: this muscle, which arises from the sides of the bodies of the last dorsal and three upper lumbar vertebræ, 9, terminates in a tendon, 10, which is inserted into the ilio-pectineal eminence, and sends from its anterior border an aponeurotic expansion, 11, which covers the common tendon of the psoas and iliacus muscles: this muscle is often absent; 12, the quadratus lumborum; 13, the obturator externus; 14, the quadratus femoris; 15, tendon of the rectus femoris; 16, the pyriformis; 17, the obturator internus; 18, the lesser sacro-sciatic ligament; 19 and 20, crura of the diaphragm.

PLATE LXVII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ANTERIOR FEMORAL REGION.

FIRST LAYER.

Fig. 1. *A*, crest of the ilium; *B*, symphysis pubis; *C*, tuberosity of the ischium; *D*, the patella.

1, the tensor vaginæ femoris; 2—3—4, the rectus femoris; 5, the sartorius: this muscle arises, by a short tondon, 6, from the anterior superior spinous process of the ilium, from the subjacent notch and from a fascia that lies between it and the tensor vaginæ femoris: it then descends obliquely inwards and backwards to gain the back part of the internal condyle of the femur, round which it turns, 7, and is inserted by a broad flat tendon, 8, into the inner side of the crest of the tibia in front of the tendons of the semi-tendinosus and gracilis: a large tendinons expansion is given off from the anterior border of this muscle as it passes round the condyle of the femur which covers the inner part of the knee-joint, the patella and its ligament, and from its lower border is given another aponeurosis, which assists to form the fascia of the leg; 9, part of the fascia of the thigh which is continuous with the tendon of the sartorius; 10, the pectineus; 11, the psoas; 12, the iliacus: these two muscles combined, 13, dip down at the upper part of the thigh, through a triangular space bounded internally by the pectineus, and externally by the sartorius and rectus; 14, the adductor longus; 15, its origin, by a strong tendon from the anterior surface of the body of the pubis; 16, the gracilis, arising by a narrow tendon from the anterior surface of the body and of the descending ramus of the pubis: the fleshy fibres terminate on the anterior surface of a tendon, 18, which winds round the inner condyle of the femur, behind the tendon of the sartorius and above that of the semitendinosus, in company with which it is inserted into the crest of the tibia; 19, the semi-membranosus; 20, its tendon; 21, the semi-tendinosus; 21', its tendon, which unites with the tendons of the sartorius and gracilis; 22, part of the adductor magnus seen between the gracilis and semi-membranosus; 22_2', anterior wall of the canal which contains the femoral vessels; 23, the vastus externus; 24, the vastus internus; 25, the obturator internus.

SECOND LAYER.

Fig. 2. *A*, crista ilii; *B*. promontory of the sacrum; *C*, anterior sacral foramina; *D*, symphysis pubis; *E*, head of the femur; *F*, tuberosity of the ischium; *G*, the patella.

1, the rectus femoris: this muscle arises by two tendons, one of which, —3, is straight and arises from the anterior inferior spinous process of the ilium: the other arises from the edge of the acetabulum and turns from behind forwards (see 13, fig. 2. Plate LXVIII.): these tendons unite and form an expansion which covers the superior part of the muscle and is continued into its substance: the fleshy fibres, which arise from this aponeurosis, run obliquely downwards and backwards, those that are most internal running from without inwards, and those that are external from within outwards: and terminate in a strong tendon which occupies the two inferior thirds of this muscle: this tendon, 4, joins the tendons of the two vasti; 5, the vastus externus; 6—6—7, the vastus internus; 8, part of the iliacus, covered by the tendon of the rectus; 9, conjoined tendon of the psoas and iliacus, 10—11—12, the pectineus; 13—14—15, the adductor longus; 16—17, the adductor brevis or parvus, covered in the greater part of its extent by the preceding muscle; 18—19—20, inferior portion of the adductor magnus; 21, a fibrous band stretching from the tendon of the adductor magnus to the vastus internus, and forming part of the canal which contains the femoral vessels; 22, opening for the transmission of a nerve; 23—23, tendon of the semi-membranosus; 24, tendon of the sartorius; 25, tendon of the gracilis; 26—27 tendon of the semi-tendinosus; 28, anterior border of the gluteus medius; 29, the pyriformis; 30, the obturator internus; 31, the greater sacro-sciatic ligament; 32, lesser sacro-sciatic ligament.

Pl. 67.

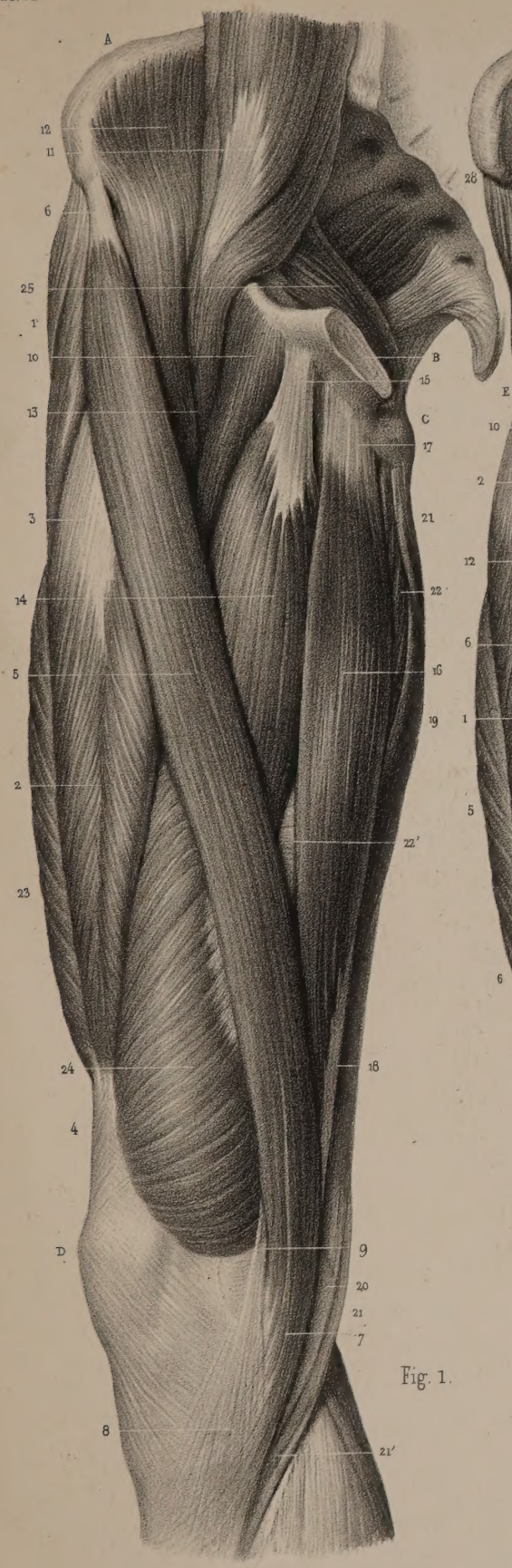

Fig. 1.

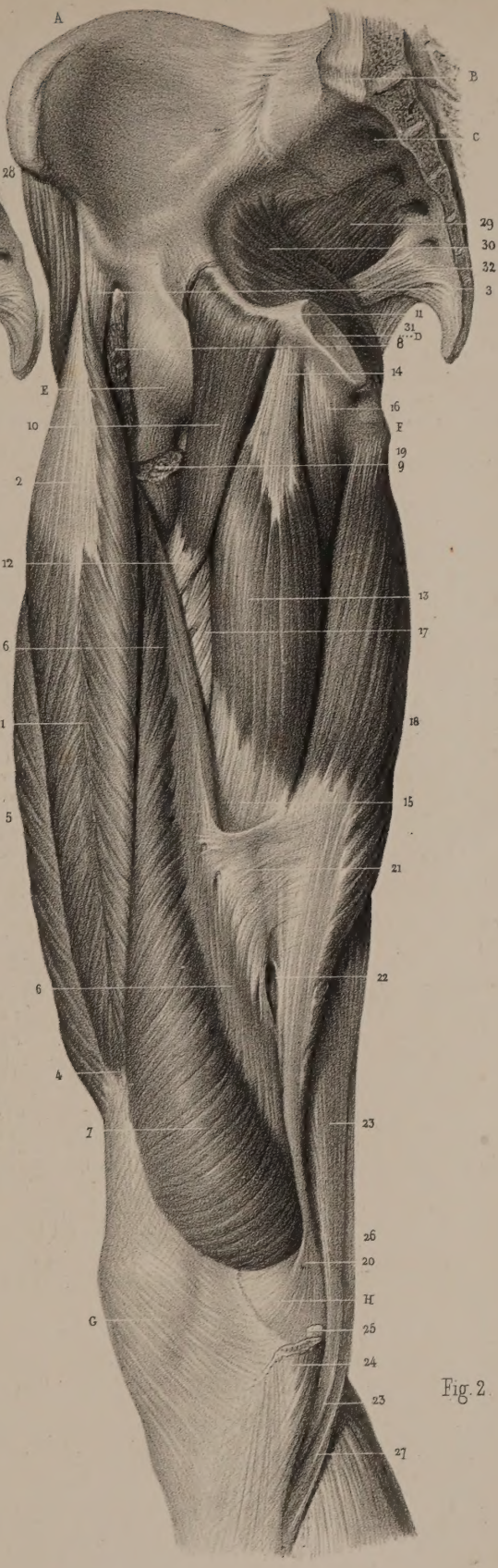

Fig. 2.

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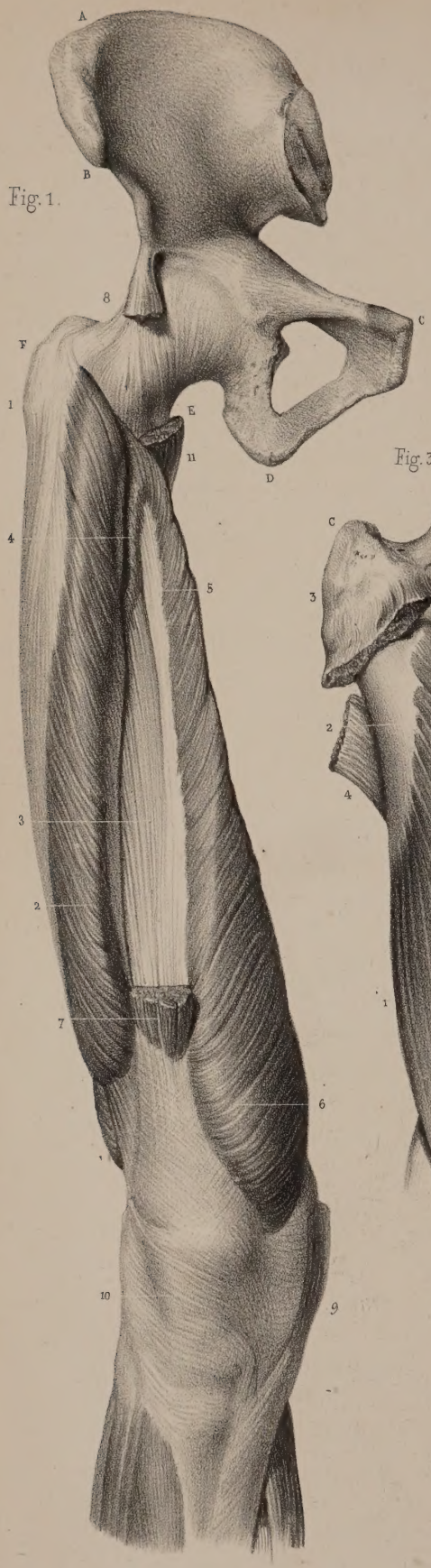

Fig. 1.

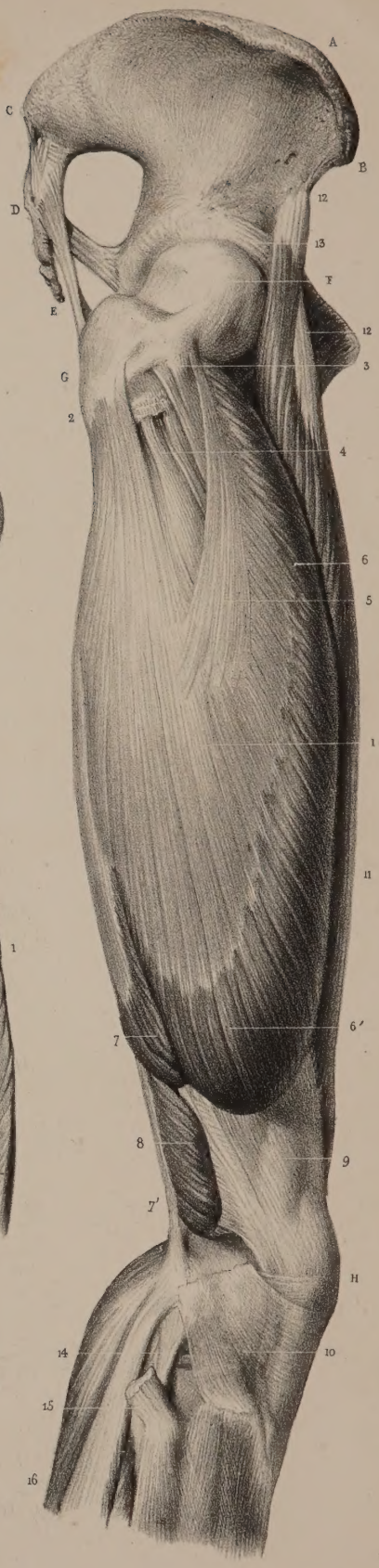

Fig. 2.

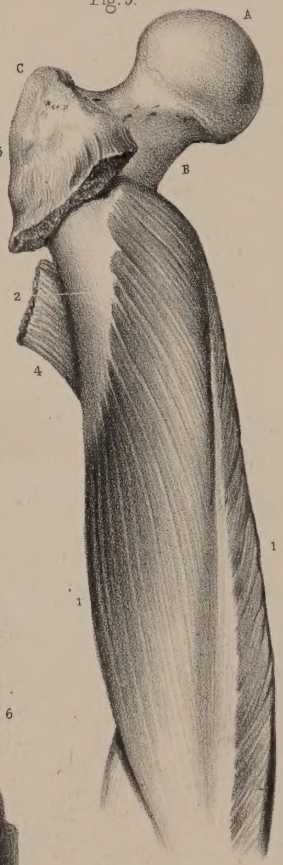

Fig. 3.

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PLATE LXVIII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ANTERIOR FEMORAL REGION.

THIRD LAYER.

Fig. 1, *A*, crest of the ilium ; *B*, anterior superior spinous process ; *C*, symphysis pubis ; *D* tuber ischii ; *E*, neck of the femur ; *F*, great trochanter.

1—2—3—4, 5—6, the triceps extensor femoris : this muscle is composed of two portions which are called the vastus externus and the vastus internus ; 1—2, the vastus externus ; 3—4—5—6, the vastus internus : the middle portion, 3, which is sometimes called the crureus, is part of the vastus internus. The tendon of the rectus, 7, unites with the tendons of the vastus internus and externus and forms the middle portion of the triceps femoris ; the vastus internus, which is in part overlapped by the vastus externus, arises from the internal margin of the linea aspera of the femur, by a tendon which joins those of the adductors (see 6—6, fig. 2, Plate LXVII.) : a great part of the fleshy fibres arise also from a ridge which extends from the anterior part of the neck of the femur to the linea aspera and from the anterior and external aspects of this bone (see 2, fig. 3) : the fibres from these different attachments are inserted into the posterior surface of a tendon which joins that of the vastus externus ; 8, tendon of the rectus ; 9, inferior extremity of the sartorius ; 10, part of the fascia lata ; 11, conjoined tendon of the psoas and iliacus muscles.

Fig. 2. *A*, crest of the ilium ; *B*, anterior superior spinous process ; *C*, posterior superior spinous process ; *D*, the sacrum ; *E*, os coccygis ; *F*, head of the femur ; *G*, the great trochanter ; *H*, the patella.

1, lateral aspect of the vastus externus : it arises, 2, from the external aspect of the great trochanter and, 3, from its anterior part and the base of the neck of the femur : it arises also from the rough surface which lies between the great trochanter and the linea aspera, and from the outer margin of the whole of the linea aspera : these origins are by fibrous bands which spread out to form a thick tendinous expansion on the posterior and external surfaces of the muscle. There is a fissure in this tendon which is bounded by fibres running in a semicircular direction, 5, for the transmission of the tendon of the gluteus parvus, 4 : the fleshy fibres, 6—6', which run in different directions terminate in a tendon which joins that of the vastus internus : the most inferior fibres of the muscle which arise from the fascia, 7', which separates it from the short head of the biceps, form two distinct fasciculi, 7 and 8, which are inserted by tendinous fibres, 9, into the outer border of the patella ; 10, part of the fascia lata ; 11, the rectus, which arises by its straight tendon, 12, from the anterior inferior spinous process of the ilium, and by its curved tendon, 13, from the margin of the acetabulum ; 14, external lateral ligament ; 15, tendon of the biceps ; 16, external head of the gastrocnemius.

Fig. 3, *A*, head of the femur ; *B*, the neck ; *C*, the great trochanter.

1—1—2, the vastus internus separate from the vastus externus ; 3, origin of the vastus externus from the base of the great trochanter ; 4, tendon of the gluteus maximus.

PLATE LXIX.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

INTERNAL FEMORAL REGION.

FIRST LAYER.

Fig. 1. *A*, Anterior superior spinous process; *B*, symphysis pubis; *C*, capsular ligament of the hip-joint; *D*, the great trochanter; *E*, the patella.

1, the pectineus: it arises by short and tendinous fibres, 2, from the spine of the pubis, from the ilio-pectineal eminence, and from the triangular surface anterior to it, and from a fibrous band which is continuous with Gimbernat's ligament: the fleshy fibres unite to form a flat muscle which is directed backwards and outwards, is a little twisted on itself as it passes along the lesser trochanter, and is inserted, tendinous, 3, into the ridge that lies between the great trochanter and the linea aspera; 4, the superficial adductor or adductor longus: this muscle lies on the same plane as the pectineus, with which it is often connected, and arises by a narrow and flat tendon from the spine and anterior part of the body of the pubis, 5; the fleshy fibres arising from this tendon run outwards and backwards, and terminate by a tendinous lamella, 6—7—7, in being inserted into the middle part of the linea aspera, between the vastus internus in front, and the adductor magnus behind; 7', part of the adductor brevis seen between the pectineus and adductor longus; 8—8, apertures for the passage of vessels; 9, tendon of the adductor magnus separated from the vastus internus, to which it is united by a fibrous band, 10—10; 11, an opening for the passage of the femoral vessels; 12, foramen for vessels; 13, conjoined tendon of the psoas and iliacus; 14—15, fleshy mass composed of the most inferior fibres of the vastus internus: this, which is quite distinct from the body of the muscle, is lost, 16, at the superior part of the synovial capsule of the knee; 17—18, tendon of the triceps extensor femoris.

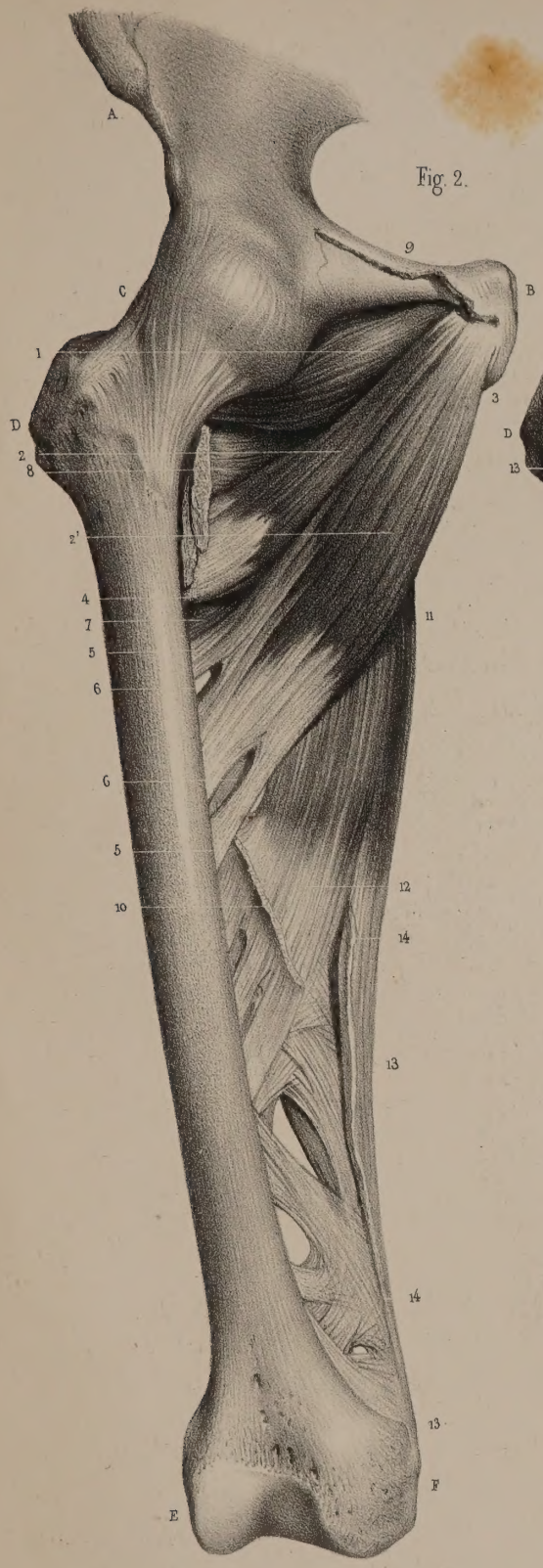
SECOND LAYER.

Fig. 2, *A*, anterior superior spinous process; *B*, symphysis pubis: *C*, capsular ligament of the hip; *D*, the great trochanter; *E*, external condyle of the femur; *F*, internal condyle.

1, the obturator externus; 2—2', adductor profundus or adductor brevis: this muscle arises, 3, by short tendinous fibres from the anterior surface of the body, and the descending ramus of the pubes: the fleshy fibres form two bundles which descend outwards and backwards, and are inserted, 4—5—5, by a tendinous expansion into the linea aspera; 6—6, aperture for the passage of vessels; 7, part of the adductor magnus seen between the two portions of the adductor brevis; 8, part of the quadratus femoris lying between the obturator externus and abductor brevis; 9, origins of the pectineus, which are continuous with those of the adductor longus; 10, tendinous insertion of the adductor longus; 11—12, middle portion of the adductor magnus; 13—13, tendon of the long portion of the adductor magnus, which is connected with that of the vastus externus by a tendinous band, 14—14.

Pl. 69.

Fig. 2.



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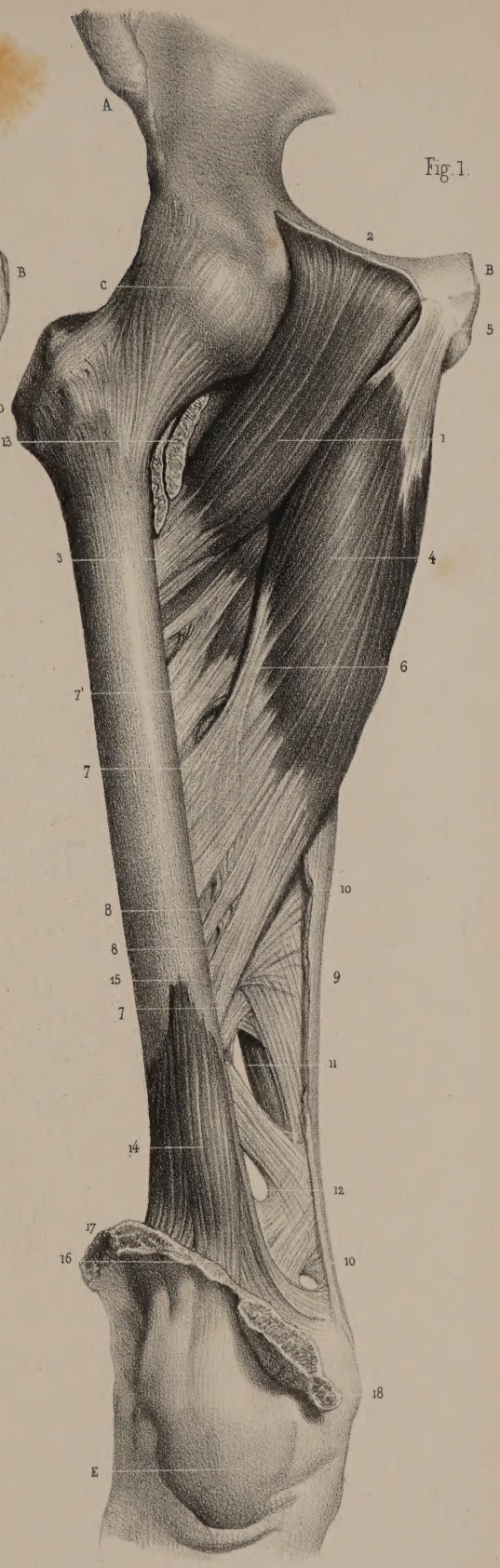

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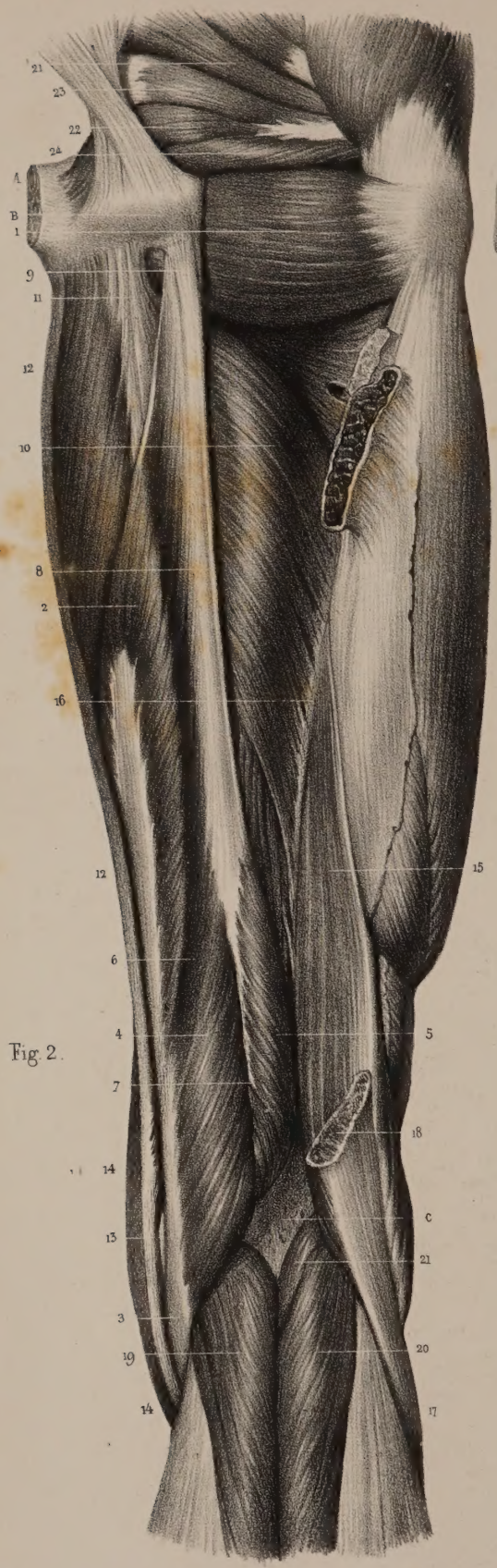

Fig. 2.

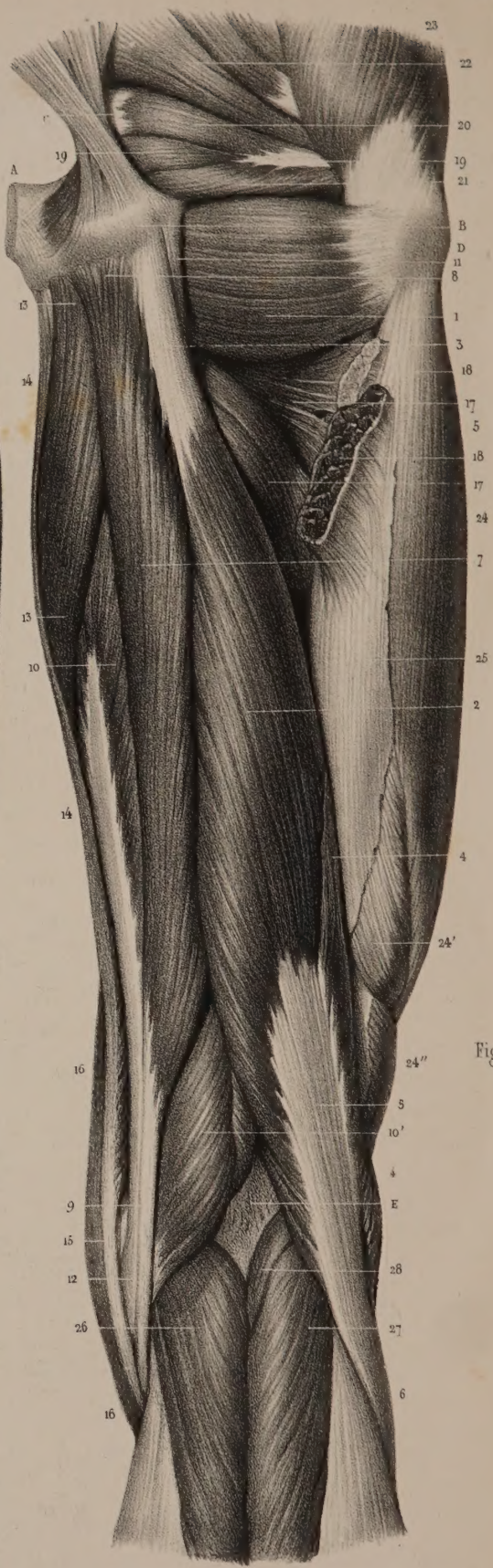

Fig. 1.

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PLATE LXX.

APPARATUS OF LOCOMOTION.—THE MUSCLES.

POSTERIOR FEMORAL REGION.

FIRST LAYER.

Fig. 1. *A*, symphysis pubis; *B*, tuberosity of ischium; *C*, spine of ischium; *D*, great trochanter; *E*, middle of popliteal space.

1, Quadratus femoris; 2, 3, 4, 5, 6, the biceps femoris, divided into two parts: the ischiadic, or long portion, 2, takes its rise from the external part of the tuberosity of the ischium by a tendon, 3, which is common to it and the semitendinosus: from the anterior surface and external border of this tendon the fleshy fibres proceed downwards and outwards to terminate in an aponeurosis, or tendon, 5, which receives on its anterior aspect the fleshy fibres of the short portion, 4. (See 15, 16, Fig. 2.) This terminal aponeurosis covers two-thirds of the posterior aspect of the muscle; it contracts, concentrating its fibres, and finally forms a thick rounded tendon, 6, which turns over the external condyle of the femur, in its course to be inserted into the head of the fibula and the external tuberosity of the tibia. (*Vide* Plate LXXIV.) 7, the simitendinosus, arising from the tuber ischii, 8, by a tendon common to it and the long portion of the biceps, and also directly from this tuberosity by a number of fleshy fibres; descending obliquely from without inwards, the semitendinosus terminates in a long and slender tendon, 9, which turns over the lateral aspect of the knee joint to be inserted into the inner tuberosity of the tibia. (*Vide* Plate LXXV.) 10—10', 11—12, the semimembranosus covered through a great part of its course by the biceps and semitendinosus; 13—13, the portion of the adductor tertius which lies between the semitendinosus, semimembranosus and the gracilis; 14—14, gracilis, the tendon of which, 15, turns round the internal tuberosity of the femur to be inserted into the crest of the tibia; 16—16, sartorius; 17—17, another portion of the third adductor, lying between the biceps, quadratus femoris and vastus externus; 18—18, tendon of the gluteus maximus; 19—19, obturator internus; 20—21, the gemelli; 22, pyramidalis; 23, gluteus medius; 24—24'—24", vastus externus; 25, external intermuscular septum; 26—27, inner and outer heads of the gastrocnemius; 28, plantaris longus.

SECOND LAYER.

Fig. 2, *A*, symphysis pubis; *B*, tuber ischii; *C*, femur in the popliteal space.

1, quadratus femoris, arising from the tuberosity and ascending ramus of the ischium, in front of the semimembranosus and adductor brevis, running horizontally outwards, and inserted into the lower part of the posterior edge of the trochanter major, and the line which extends from the trochanter major to the trochanter minor; 2—3—4—5—6—7—8—9, semimembranosus, composed as it were of two muscles locked one within the other. The upper fasciculus, 2, long and slender, terminates in a tendon, 3, which descends towards the internal tuberosity of the tibia, giving rise along its outer edge to the fibres of the inferior fasciculus, 4—5—6. The inferior fasciculus is large and rounded; its fleshy fibres, arising, as said, from the tendon of the upper fasciculus, terminate successively on the anterior aspect of the tendon, 7, which is concealed at first in their thickness, but becomes disengaged by and by, and ascends to be connected with the tuber ischii, 9, in front of the biceps and semitendinosus. This tendon, of great thickness, gives rise in its turn to the fleshy fibres of the superior belly or fasciculus; immediately beneath the tuber ischii it sends off an aponeurotic slip, which splitting into two laminæ receive the uppermost fibres of the superior belly or fasciculus between them; 10—11, adductor tertius, covered by the semi membranosus; 12—12, the gracilis, which terminates in a long and slender tendon, 13, situated behind the internal condyle of the femur, between the sartorius, 14, and the tendon of the semi-membranosus; 15—16, femoral or short portion, or belly of the biceps, which arises from the greater portion of the linea aspera femoris, and external intermuscular septum, and ends in a tendon, 17, which is common to it and the long head of the muscle, 18; 19—20, heads of the gastrocnemius; 21, plantaris longus; 21', pyramidales; 22—23—24, obturator internus and gemelli.

PLATE LXXI.

APPARATUS OF LOCOMOTION—THE MUSCLES.

INTERNAL FEMORAL REGION.

THIRD LAYER.

Fig. 1. *A*, crista illii; *B*, symphysis pubis; *C*, head of femur; *D*, trochanter major; *E*, internal condyle; *F*, external condyle; *G*, sulcus between the two condyles.

1, obturator externus; 2, quadratus femoris; 3—4—5—6—7, triceps adductor, anterior aspect. This muscle is composed of three portions: the superior or short portion, (adductor brevis) 3, is situated in front of the middle portion, from which it is almost always distinct; the fleshy fibres of which it consists arise from the descending ramus of the os pubis, and run nearly horizontally outwards, to be inserted into the upper fourth of the linea aspera femoris and rugous imprint which extends from this line to the base of the trochanter major; 4, middle portion, (longus adductor,) is inserted into the three inferior fourths of the linea aspera. The inferior and longest portion, (adductor magnus,) 6, inserted into a tubercle on the internal condyle of the femur, by a tendon, 7, which unites intimately with the vastus internus. The two latter portions are separated by the opening, 9, which transmits the femoral vessels; 8, a small vascular foramen.

Fig. 2. *A*, ilium; *B*, sacro-sciatic ligament; *C*, tuberosity of the ischium; *D*, symphysis pubis; *E*, trochanter major; *F*, inner condyle; *G*, outer condyle of the femur.

1—2—3—4, the triceps adductor seen on its posterior aspect; 3, the inferior and longest portion; (ad. magnus) 5, the middle portion. These two portions arise by a common tendon, 1, from the inferior part of the tuberosity of the ischium, and 2, from the outer lip of the ascending ramus of that bone. The fleshy fibres then form two orders or divisions: one of these, oblique from without inwards, constitutes the largest portion of the muscle, and is inserted into the whole length of the linea aspera, and by means of a powerful tendon into a tubercle situated on the posterior and superior part of the inner condyle; the other, oblique from within outwards, constitutes the middle portion of the muscle, and is inserted by an aponeurosis, which presents numerous openings, 6—8, for the passage of the blood-vessels, into the interstice of the linea aspera femoris; 9, opening for the passage of femoral vessels; 10, fleshy fibres, part of the superior portion of the triceps adductor; 11, quadratus femoris; 12, tendon of the gluteus maximus; 13—13, gastrocnemius.

Pl. 71.

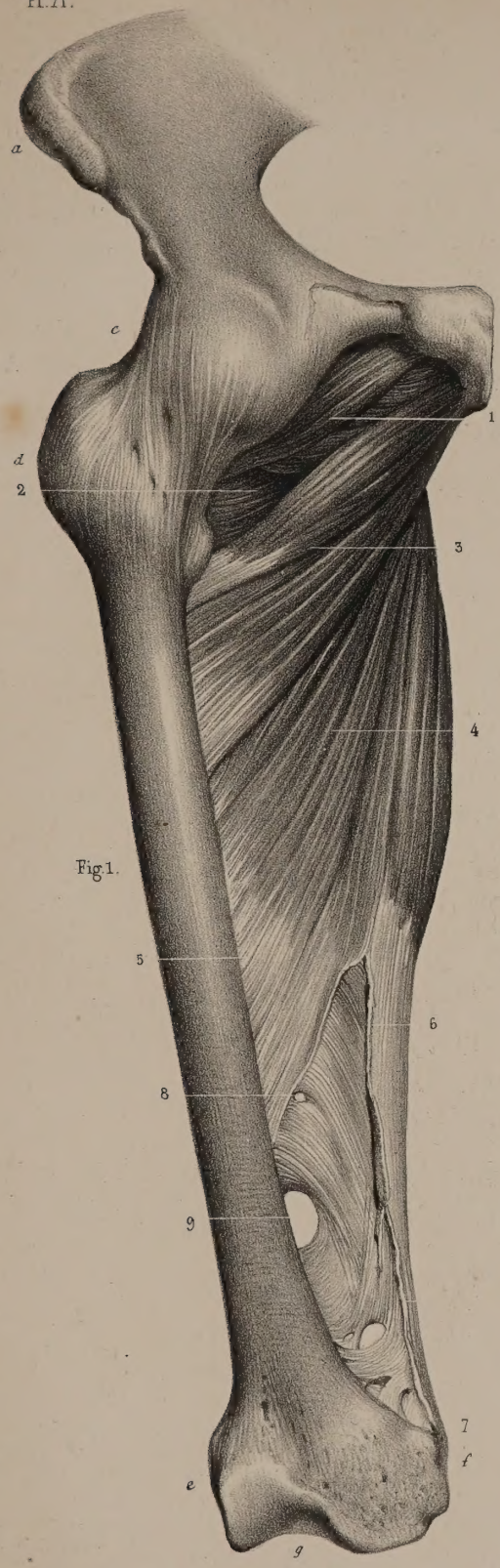

Fig. 1.

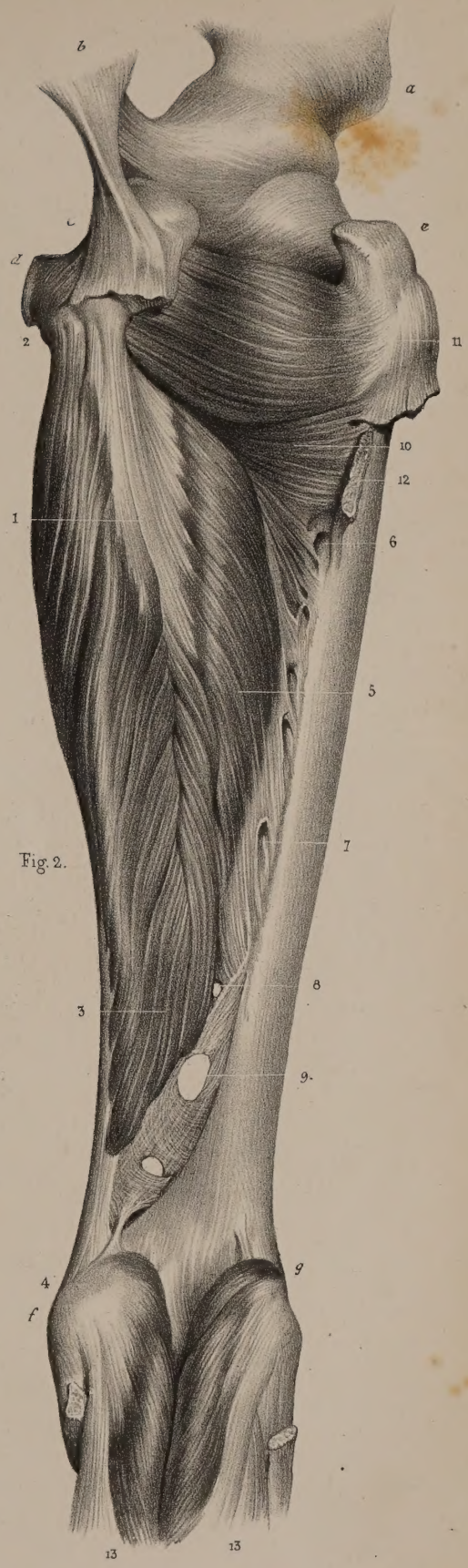

Fig. 2.

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PLATE LXXII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ANTERIOR REGION OF THE KNEE.

1, the rectus; 2, its insertion into the patella; 3 and 4, lower portions of the vastus externus and internus: the superficial layer of these muscles spreads out to form a tendinous expansion by which the patella and the tendon of the rectus are covered; 5, fascia lata: this membrane forms a strong external lateral ligament and divides into two lamellæ, of which the deeper one, 6, is intimately connected with the tendon of the vastus externus, and the more superficial one, 7—8, covers the patella, the ligamentum patellæ, and the inner side of the joint and terminates at the internal condyle of the tibia, where it is lost in the tendinous expansion, 9—10, of the insertion of the sartorius: the bursa mucosa of the patella is developed between these two lamellæ; 11—11, the sartorius, which is inserted into the crest of the tibia by a broad flat tendon, 12—13; 14, the tibialis anticus; 15, the extensor communis digitorum; 16, the peroneus longus; 17, the external head of the gastrocnemius; 18, its internal head; 19, the soleus.

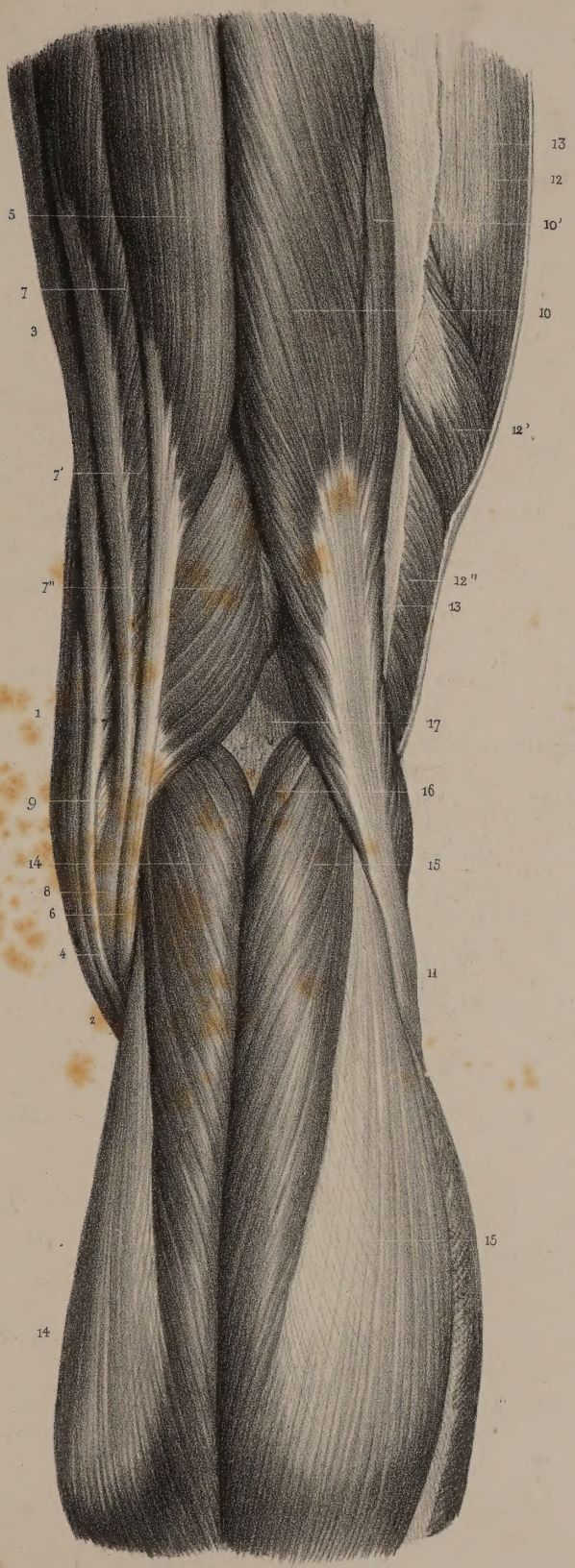
PLATE LXXIII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

POSTERIOR REGION OF THE KNEE.

1—2, the sartorius; 3—4, the gracilis; 5—6, the semi-tendinosus; 7—7'—7"—8, the semi-membranosus. All these muscles turn from behind forwards round the internal condyle of the femur, 9, to their insertions: the semi-membranosus is inserted into the internal condyle of the tibia: the sartorius, gracilis, and semi-tendinosus are inserted into the anterior tubercle of the tibia and into the inner side of its crest; 10, long head of the biceps; 10', short head of that muscle: these two portions unite to form a common tendon, 11, which turns round the external condyle to be inserted into the head of the fibula, and into the tubercle of the tibia; 12—12'—12", the vastus externus, separated by fascia, 13—13, from the short head of the biceps; 14—14, internal head of the gastrocnemius; 15—15, external head; 16, the plantaris, 17, the popliteal space: the size of this space, which is lozenge-shaped, depends on the degree of development of the different muscles by which it is bounded, particularly the semi-membranosus, which is sometimes so large as entirely to fill it: the popliteal space is bounded at the upper and outer part by the biceps: at the upper and inner part by the semi-tendinosus and semi-membranosus: at the lower and outer side by the plantaris and the outer head of the gastrocnemius, and at the lower and inner part by the internal head of that muscle.

Pl. 73.



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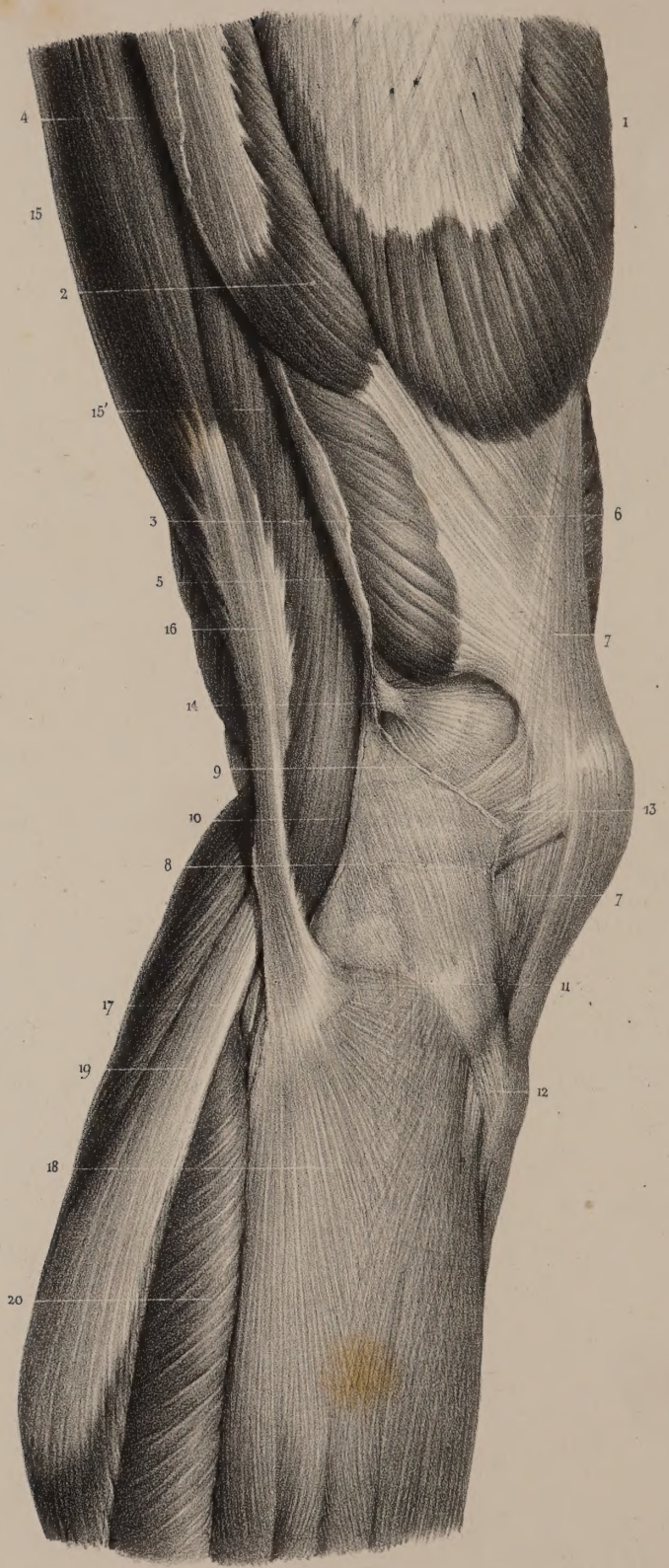

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PLATE LXXIV.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

EXTERNAL REGION OF THE KNEE.

1—2—3, the vastus externus: this muscle, at the lower part of the thigh, is divided into three parts: the two posterior of which, 2—3, are separated from the anterior one by a deep fissure: they arise from the intermuscular septum, 4—5, and terminate in a thick tendinous expansion, 6, which is inserted into the outer side of the patella. A prolongation, 7—7, of the tendon of the rectus covers the synovial capsule of the knee at the outer side of the patella and terminates at the outer condyle of the tibia; 8—9, deep-seated lamella of the fascia lata from which the superficial one, 10, has been detached: the deep-seated lamella which is attached to the external condyle and tubercle of the tibia, assists to form the external ligament of the patella, 13, and gives off a fibrous band, 14, which covers the outer side of the capsule of the joint; 15—15', the biceps; 16, its tendon, which is inserted, 17, into the head of the fibula and the outer condyle of the tibia: this tendon sends off a tendinous process to the fascia of the leg 18; 19, outer head of the gastrocnemius; 20, the soleus.

PLATE LXXV.

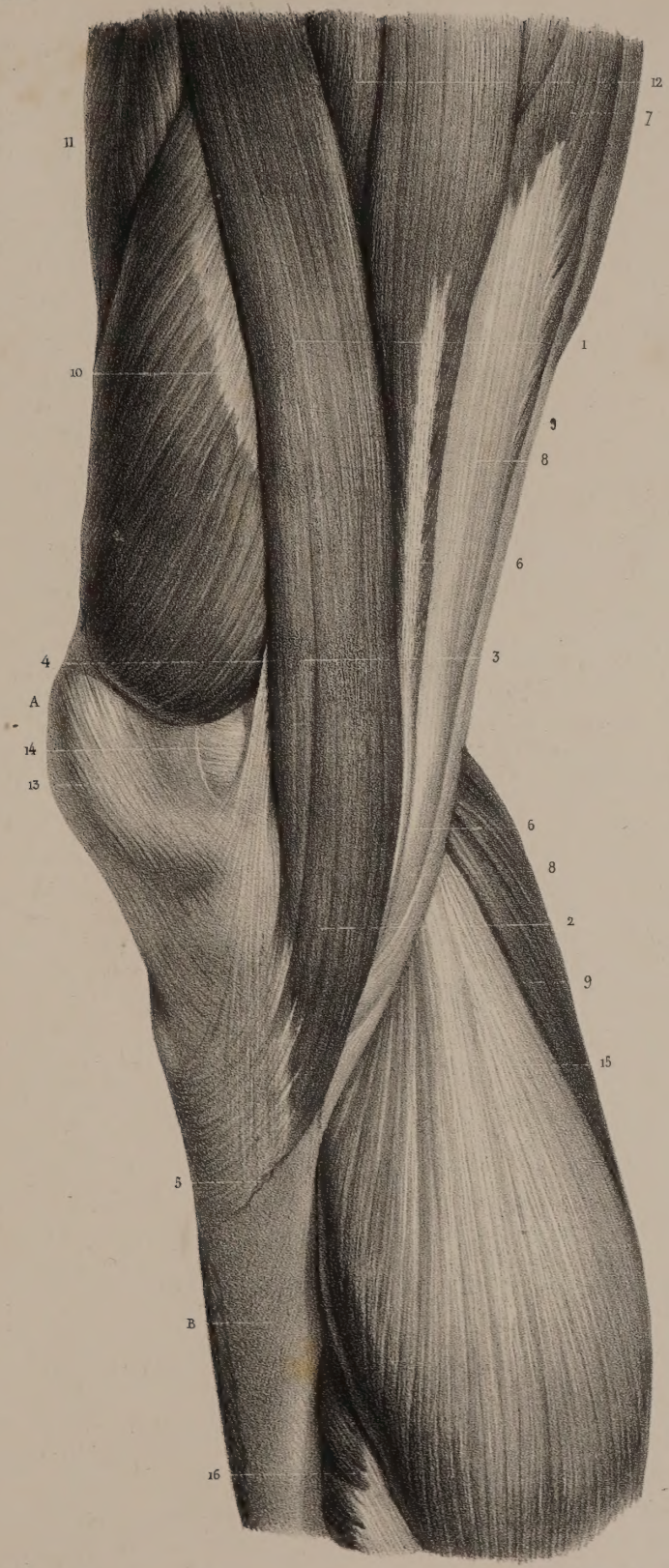
APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

INTERNAL REGION OF THE KNEE.

A, The patella; *B*, internal aspect of the tibia.

1, The sartorius: at the lower part of the thigh this muscle is divided into two fasciculi: the posterior one, 2, which is broad and thick turns forward round the inner condyle of the femur and is inserted into the internal part of the crest of the tibia, in front of the gracilis and semi-tendinosus, which unite with it: from its lower part proceeds an expansion, which assists to form the fascia of the leg: the anterior portion, 3, terminates in a broad tendinous expansion, which covers the inner side of the knee-joint; 4—5, part of the fascia of the thigh, the fibres of which are interwoven with those of the tendon of the sartorius and go to form the fascia of the leg; 6—6, tendon of the gracilis: this tendon lies at first between the sartorius and the semi-membranosus, but after turning round the internal condyle of the tibia, it lies behind the tendon of the sartorius and above that of the semi-tendinosus, with both of which it unites; 7, the semi-membranosus; 8—8, its tendon which is broad and thick and runs down between the gracilis and semi-tendinoses to be inserted into the inner condyle or tuberosity of the tibia; 9—9, tendon of the semi-tendinosus which turns round the inner condyle of the tibia and then runs directly forwards to be inserted into the tubercle of the tibia, behind the sartorius and along the lower border of the gracilis, to which it is united: a tendinous expansion is sent off from the lower border of this tendon to the fascia of the leg; 10, the vastus internus; 11, the rectus; 12, part of the adductor magnus, seen between the sartorius and the gracilis; 13, the superficial covering of the knee; 14, internal ligament of the patella; 15, inner head of the gastrocnemius; 16, the soleus.

Pl.75.



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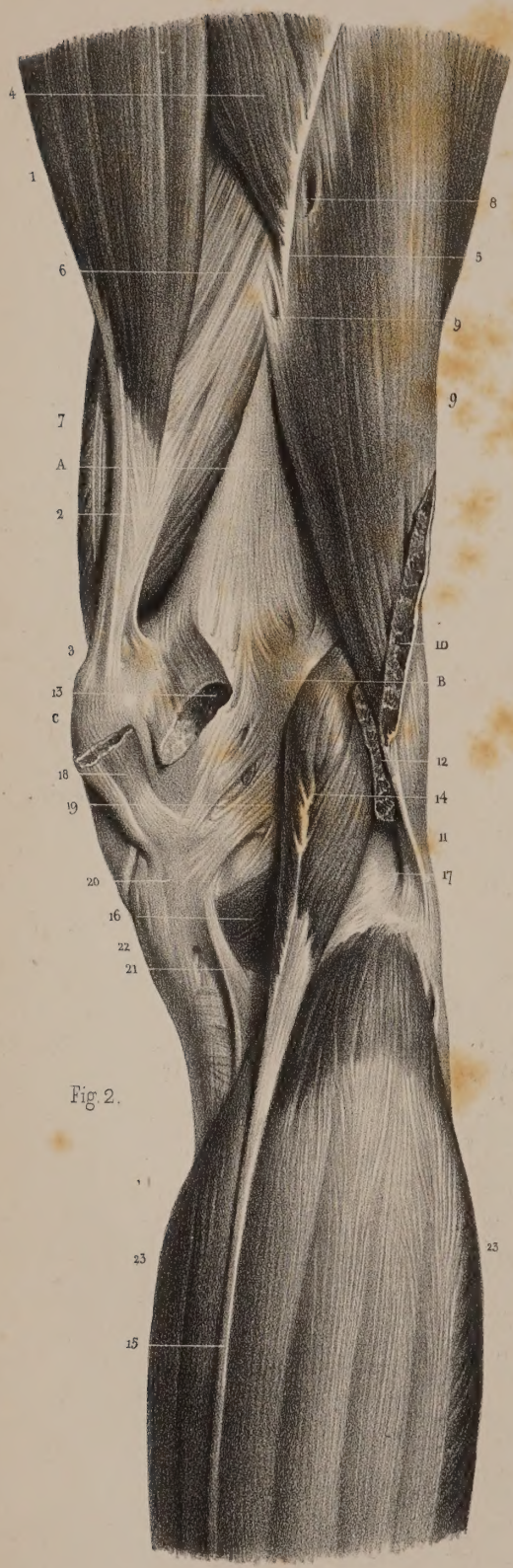

Fig. 2.

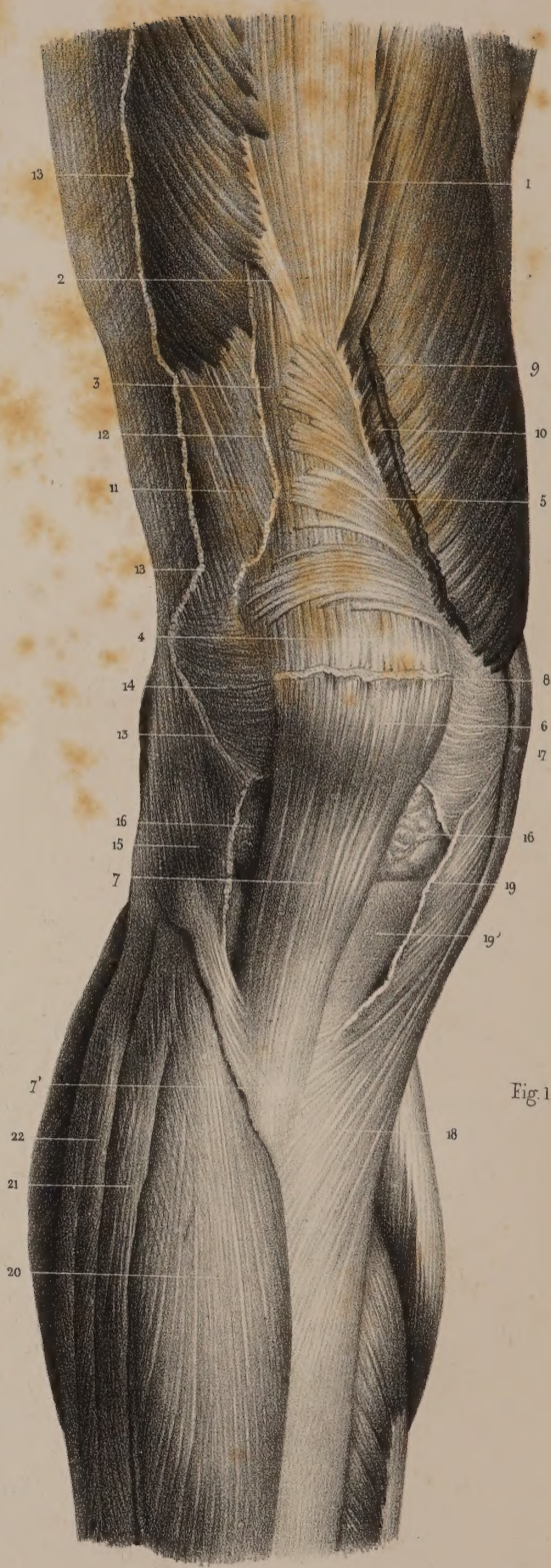

Fig. 1.

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PLATE LXXVI.

APPARATUS OF LOCOMOTION.—MYOLOGY.

ANTERIOR REGION OF THE KNEE.

SECOND LAYER.

Fig. 1, 1—2—3—4, common tendon of the triceps femoralis, composed of vertical fasciculi which decussate and are united by transverse fibrous bands, 5, into a tendon of great strength which is inserted into the patella; 6—7, tendon of the rectus femoris, inserted at 7' into the anterior tuberosity of the tibia. Although intimately connected with the tendon of the triceps femoris in front of the patella, the tendon of the rectus is nevertheless readily enough separated from it; 9—10, superficial aponeurotic lamina of the vastus internus; 11—12, superficial aponeurotic layer of the vastus externus; 13—13, cut edge of the fascia lata femoris; 14, external ligament of the patella; 15, attachment of the fascia lata to the external tuberosity of the tibia; 16—16, adipose tissue placed as a pad over the capsular ligament of the knee-joint; 17, lower extremity of the sartorius which is inserted at, 18, into the spine of the tibia; 19, aponeurotic expansion which covered the internal tuberosity of the tibia, 19; 20, tibialis anticus; 21, extensor communis digitorum; 22, peroneus longus.

POSTERIOR REGION OF THE KNEE.

THIRD LAYER.

Fig. 2. *A*, part of the femur from the bifurcation of the linea aspera downwards; *B*, external, and *C*, internal condyle.

1, long portion of the adductor tertius, inserted by a thick and strong tendon, 2, into the posterior and superior part of the inner condyle of the femur; 3—4, middle portion of the adductor tertius, inserted at, 5, into the linea aspera between the vastus internus, 6—7, and the short portion of the biceps, 8—9. These two portions are inserted by a common tendon, 11, into the head of the fibula; 12, head of the outer belly of the gastrocnemius divided; 13, origin of the inner belly of the gastrocnemius which is removed; 14—15, plantaris longus; 16—17, popliteus; 18, tendon of the semimembranosus divided into three portions: the outer portion, 19, concurs in forming the posterior ligament of the knee-joint; the middle portion, 20, is attached to the posterior part of the internal tuberosity of the tibia; it sends an aponeurotic expansion, 21, which covers the popliteus; the inner portion, 22, continuous with the middle portion glides backwards and forwards upon the internal tuberosity of the head of the tibia, and runs to be inserted into the internal part of this prominence; 23—23, the soleus.

Pl. 77.

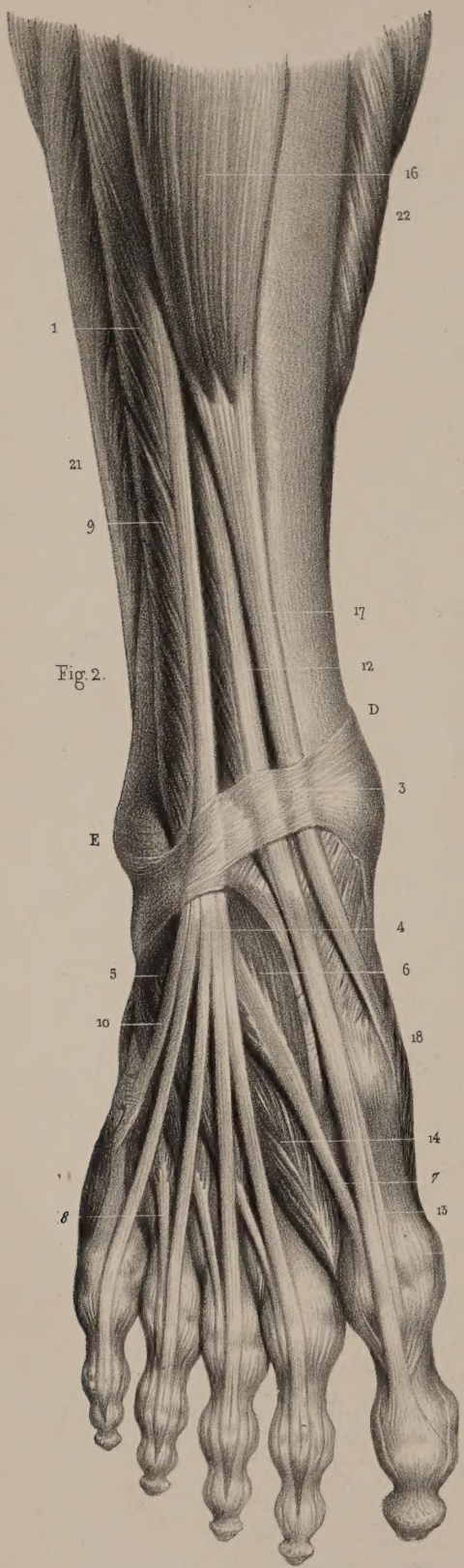

Fig. 2.

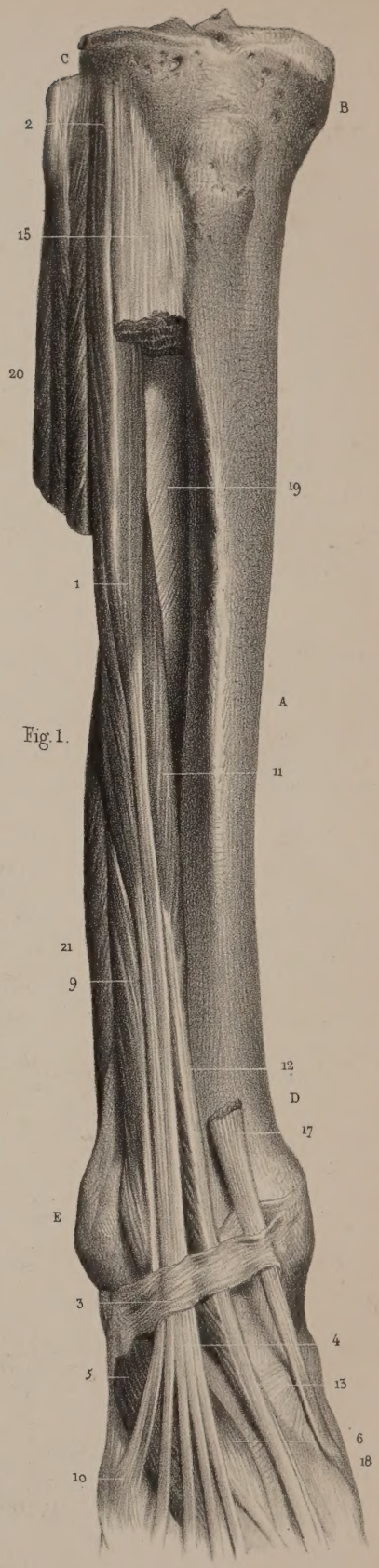

Fig. 1.

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PLATE LXXVII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

ANTERIOR REGION OF THE LEG.

Fig. 1. *A*, the tibia; *B*, its superior extremity; *C*, head of the fibula, Figs. 1 and 2, *D*, malleolus internus; *E*, malleolus externus.

Figs. 1 and 2. 1, the extensor longus digitorum; 2, fig. 1, its upper extremity. This muscle arises from the external tuberosity of the tibia, from the head and anterior surface of the fibula, and from the ligaments that connect these two bones together; it arises also from the interosseous ligament, from the fascia of the leg, and the intermuscular septa; from these origins the fleshy fibres unite to form two fasciculi which each terminate in a tendon: these tendons, which are often connected together, pass under the annular ligament, 3, in company with the tendon of the peroneus tertius, and then divide to form the tendons of the second, third, fourth, and fifth toes, 4, figs. 1 and 2, which pass over the dorsum of the foot, and cross the fibres of the short extensor at an acute angle. On reaching the first phalanx these tendons unite with those of the lumbricales and interossei, and divide into three portions, of which the middle one is inserted into the posterior extremity of the second phalanx, and the two lateral ones, which are at first separate, but afterwards unite, are inserted into the third phalanx; figs. 1 and 2. 5—6, the musculus dorsi pedis, or extensor brevis digitorum, consisting of four fleshy bundles which terminate each in a tendon, of which the internal one, 7, runs under the tendon of the long extensor, and the three others, 8, are intimately connected to the outer border of the corresponding tendons of the long extensor; figs, 1 and 2. 9, the peroneus tertius or peroneus anticus: this muscle seems to be part of the long extensor: it arises from the inferior third of the anterior and internal surface of the fibula, from the interosseous ligament and the fascia that separates it from the peroneus brevis: the fleshy fibres unite around a tendon, 10, which passes under the annular ligament in the same sheath as the tendon of the extensor longus, and is inserted into the base of the metatarsal bone of the little toe: there is sometimes an accessory slip that connects it with the tendon belonging to the little toe. Fig. 1. 11, the extensor proprius pollicis, arising by fleshy fibres from the internal aspect of the fibula, and from the interosseous ligament; the tendon, 12—13, figs. 1 and 2, passes under the annular ligament, and after running along the dorsum of the first metatarsal bone, is inserted into the base of the last phalanx of the great toe. Fig. 2. 14, first dorsal interosseous muscle. Fig. 1. 15, Superior extremity of the tibialis anticus; this muscle has been almost entirely removed for the purpose of showing the extensor proprius pollicis: the tibialis anticus (see PLATE LXXX.) arises from the external tuberosity of the tibia and from the two upper thirds of its outer surface, from the interosseous ligament, from the fascia of the leg, and the intermuscular septa: the fleshy fibres, 16, fig. 2, unite to form a tendon, 17, figs. 1 and 2, which crosses the annular ligament and is inserted into the tubercle of the internal cuneiform bone, 18: it generally sends an aponeurotic expansion to the first metatarsal bone. Fig. 1. 19, the interosseous ligament; 20, the peroneus longus; 21, figs. 1 and 2, the peroneus brevis; 22, the soleus.

PLATE LXXVIII.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

POSTERIOR REGION OF THE LEG.

FIRST LAYER.

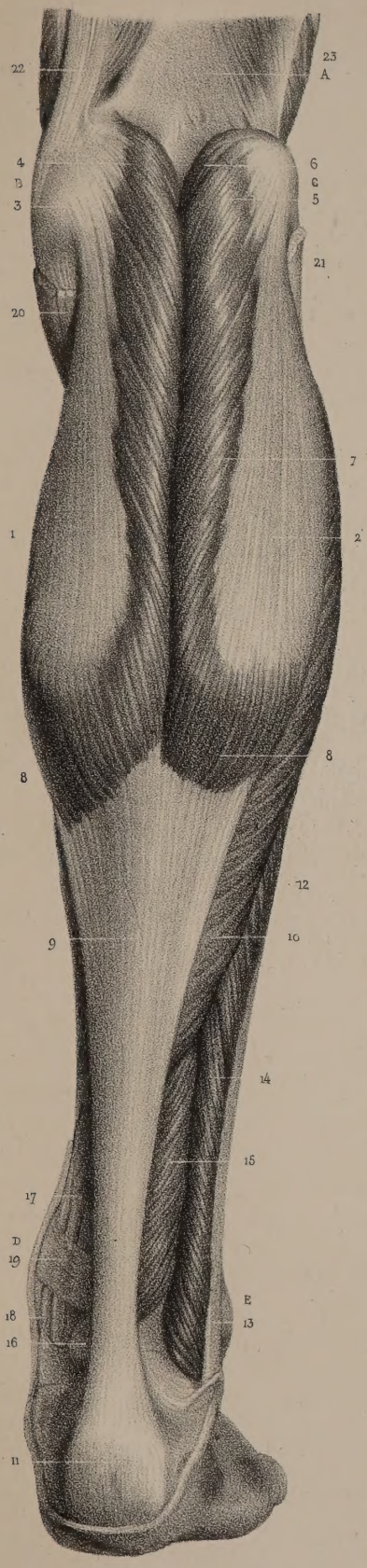
Fig. 1, *A*, inferior extremity of the femur; *B*, internal condyle; *C*, external condyle; *D*, malleolus internus; *E*, malleolus externus.

1 and 2, the gastrocnemius or gemellus, arising by two heads: the internal one, 1, which is the larger of the two, arises by a thick tendon from the upper part of the internal condyle of the femur, from a depression situated immediately behind the tubercle for the insertion of the adductor magnus: some of the fleshy fibres, 4, arise also from the internal line of bifurcation of the linea aspera. The external head, 2, arises by a rather smaller tendon, 5, from an eminence at the inner and posterior part of the external condyle, above the insertion of the popliteus; 6, accessory slip of the gastrocnemius,—the plantaris. The tendons by which the two heads of this muscle arise are closely connected to the fibrous capsule of the knee-joint, and spread out posteriorly to form an aponeurotic covering for the fleshy fibres, being thickest at that part which covers the internal head. The fleshy fibres are inserted, 7, into a median raphé, and 8—8, into the posterior surface of the common aponeurosis, 9, which unites with that of the soleus, 10, to form the tendo Achillis, 11; 12—13, the peroneus longus; 14, the peroneus brevis; 15—16, the flexor longus pollicis; 17, tendon of the flexor longus digitorum; 18, tendon of the tibialis posticus; 19, posterior annular ligament; 20, tendon of the semi-membranosus; 21, tendon of the biceps; 22, tendon of the adductor magnus; 23, inferior extremity of the vastus externus.

SECOND LAYER.

Fig. 2, *A*, inferior extremity of the femur; *B*, internal condyle; *C*, external condyle; *D*, internal tubercle of the tibia; *E*, head of the fibula; *F*, malleolus internus; *G*, malleolus externus.

1, the plantaris: it arises, 2, from the back and upper part of the external condyle, from the capsule of the knee and from the fascia covering the outer head of the gastrocnemius; it terminates in a long thin tendon, 3, which runs down along the inner border of the tendo Achillis and is inserted with it into the posterior surface of the calcaneum; 4, the soleus, arising, 5, from the head of the fibula by a strong tendon which spreads out to form an aponeurosis to cover the muscle: also 7—8—9, from the upper third of the posterior aspect of the fibula and from the upper half of its outer border by a fibrous lamella that separates the muscle from the peroneus longus. It arises also from the oblique line and internal border of the tibia by an aponeurosis that covers the anterior surface of the muscle and pervades its structure: some fleshy fibres also take their origin from a fibrous band stretching between the oblique line of the tibia and the head of the fibula. From these numerous origins the fleshy fibres are inserted, some into a fibrous septum which separates the muscle into two parts, and some into the aponeurosis which joins that of the gastrocnemius about the middle of the leg. The tendo Achillis, 10, which is formed by the junction of the tendons of the gastrocnemius, soleus and plantaris, slides overthe upper part of the posterior aspect of the os calcis, having a bursa between them, and is inserted, 11, into the inferior part of that bone; 12, 13, 14, 15, 16, 17, 18, 19, refer to the same parts as in fig. 1; 20, tendon of the semi-membranosus; it sends off an aponeurotic expansion, 21, which covers the popliteus, 22; 23, tendon of the biceps; 24, tendon of the inner head of the gastrocnemius; 25, tendon of the outer head; 26, tendon of the adductor magnus; 27, inferior extremity of the vastus externus.



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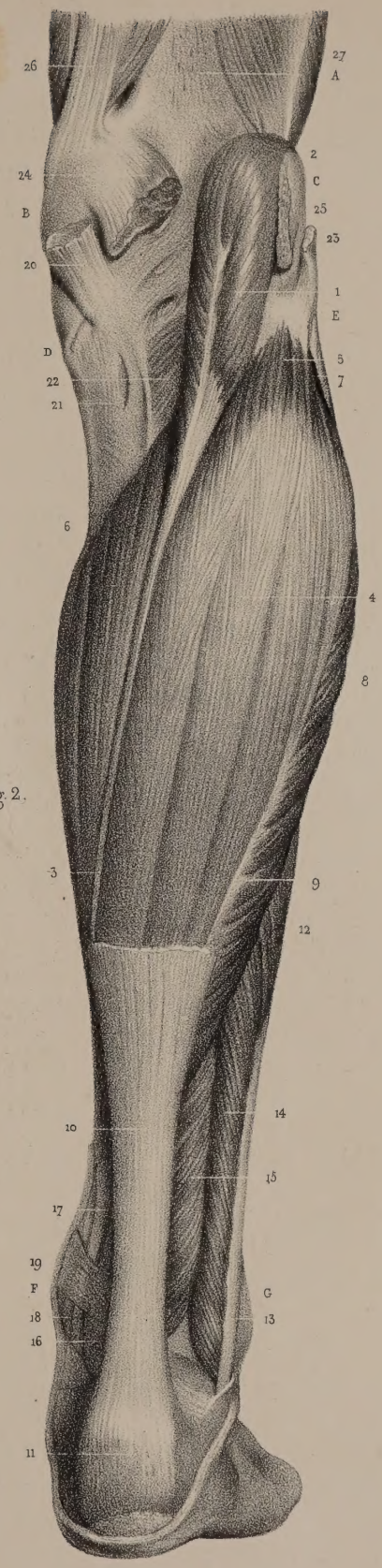

Fig. 2.

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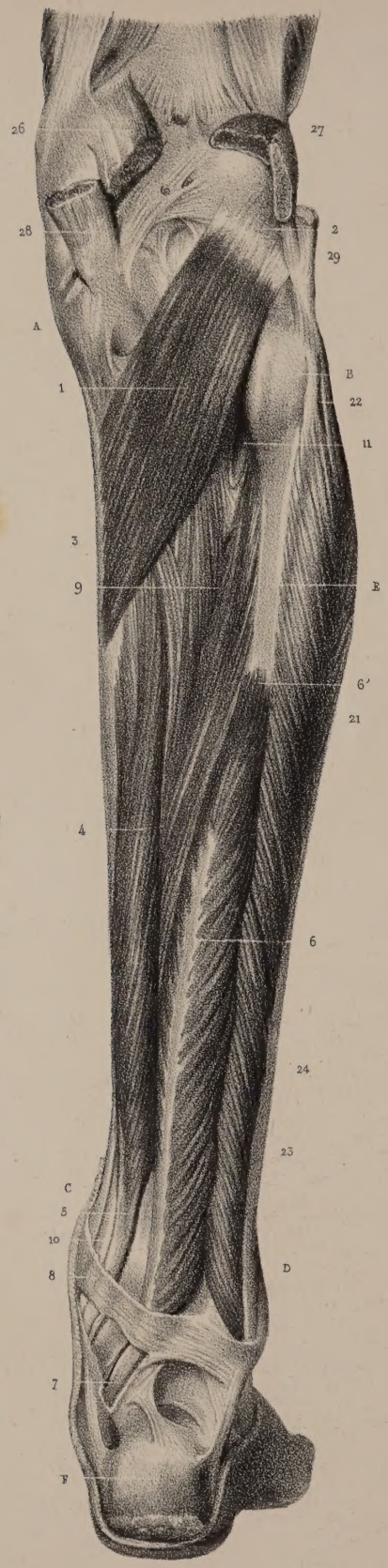

Fig. 1

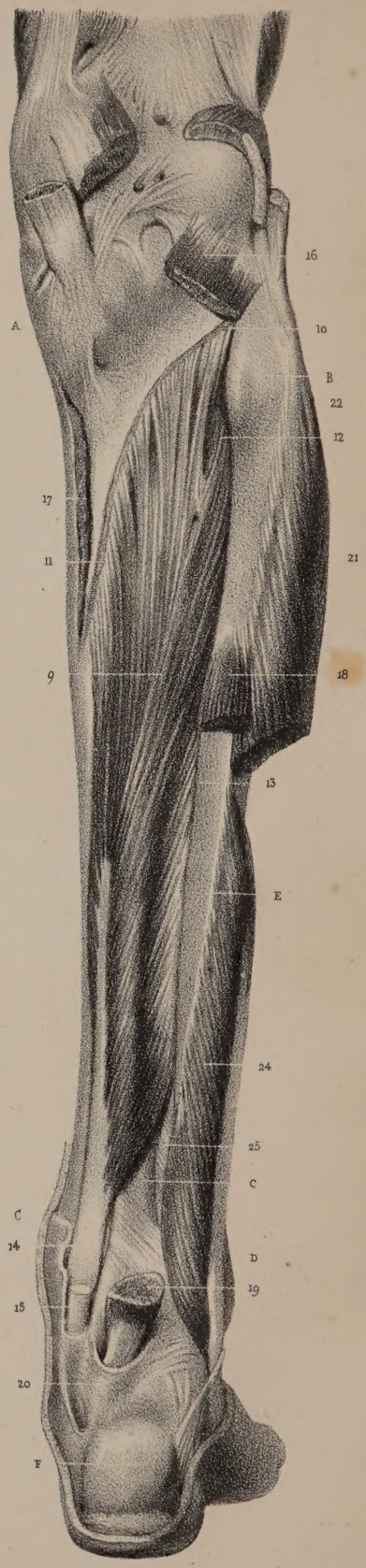

Fig. 2

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PLATE LXXIX.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

POSTERIOR REGION OF THE LEG.

THIRD LAYER.

Figs. 1 and 2. *A*, internal condyle of the tibia; *B*, head of the fibula; *C*, inferior extremity of the tibia; *D*, malleolus externus; *E*, posterior surface of the fibula; *F*, the os calcis.

Fig. 1, the popliteus: this muscle takes its origin by a strong tendon, 2, from a depression situated at the posterior part of the external condyle of the femur, immediately below the attachment of the external head of the gastrocnemius; the tendon, which is covered by the synovial membrane of the knee-joint, spreads into an aponeurosis which is prolonged into the thickness of the muscle; the fleshy fibres, which are very long and oblique at the inferior part, terminate at, 3, the triangular surface and internal border of the tibia, by means of an aponeurotic expansion of the tendon of the semi-membranosus. 4, The flexor longus digitorum; this muscle arises from the oblique line of the tibia, from the middle of its posterior surface and from the fascia that covers the tibialis posticus; from these origins the fibres are inserted into the anterior surface of a tendon, 5, which at first is imbedded in the substance of the muscle, but emerges just before passing round the malleolus internus, which it does with the tendon of the tibialis posticus, to join the inner side of the os calcis. 6—6', The flexor longus pollicis, arising from the two lower thirds of the posterior surface of the fibula, from the fascia covering the tibialis posticus, from the interosseous ligament and fascia separating it from the peronei: the fleshy fibres terminate round a tendon, 7, which is placed at the posterior part of the muscle; the tendon passes under the annular ligament, 8, and runs along the oblique groove in the astragalus and under the calcaneum. 9, The tibialis posticus; 10, its tendon; 11, space for the passage of the anterior tibial vessels. To see the tibialis posticus properly, it is necessary to remove the popliteus, the flexor communis digitorum, and the flexor longus pollicis, which cover it in great measure (see fig. 2.)

Fig. 2. 9, The tibialis posticus; it arises, 10—11, from the oblique line and posterior surface of the tibia, 12—13, from that portion of the fibula which is behind the interosseous ligament, from that ligament, and from a fascia that covers the posterior surface of the muscle: the fleshy fibres converge round a tendon, 14, which is imbedded amongst them and emerges at the inner ankle, round a groove in the posterior part of which it passes, in front of the tendon of the flexor longus digitorum. 16—17, Insertion of the popliteus. 18, Superior extremity, 19, inferior extremity of the flexor longus pollicis. 20, Sheath of fascia that covers the tendons.

Fig 1. 21—22, the peroneus longus; 23, its tendon: fig. 2. 21—22, the same muscle cut through about the middle; 24, fig. 1 and 2, the peroneus brevis; 25, fig. 1, the interosseous ligament; fig. 1, 26 and 27, origins of the gastrocnemii; 28, tendon of the semi-membranosus; 29, tendon of the biceps.

PLATE LXXX.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

EXTERNAL REGION OF THE LEG.

FIRST LAYER.

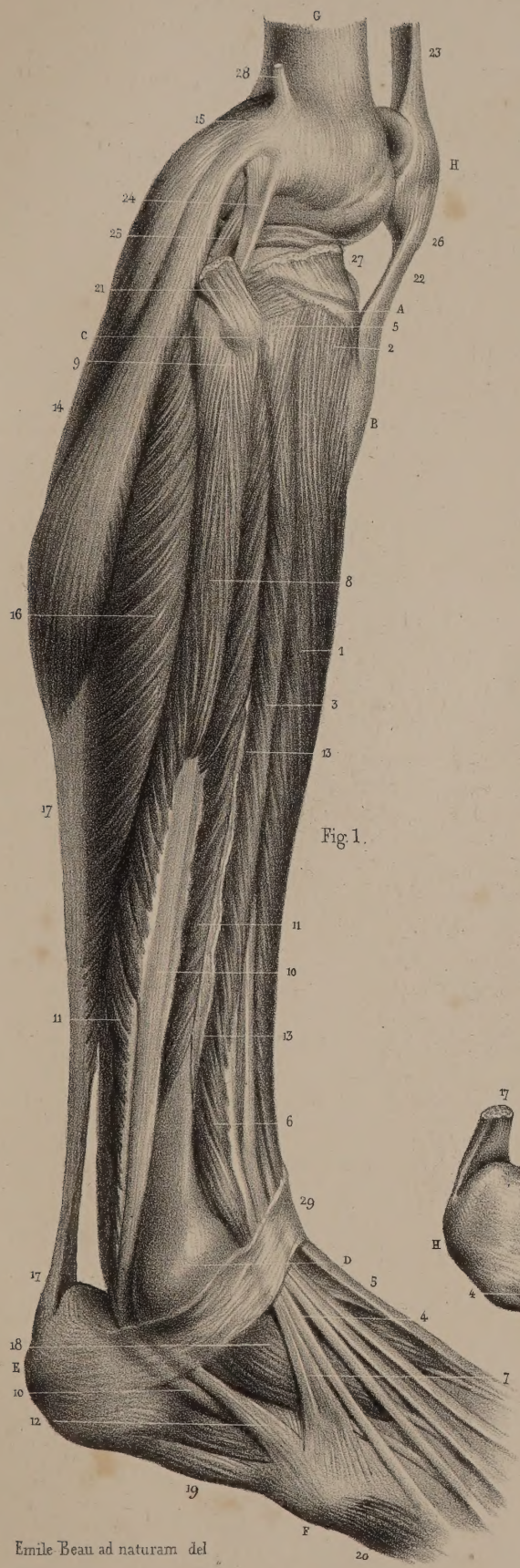
Fig. 1. *A*, superior extremity of the tibia; *B*, tubercle; *C*, head of the fibule; *D*, malleolus externus; *E*, the os calcis; *F*, posterior extremity of the fifth metatarsal bone; *G*, inferior extremity of the femur: *H*, the patella.

1—2, the tibialis anticus: 3—3, the extensor longus digitorum; 4, tendons of the latter muscle. 5, Tendon of the extensor proprius pollicis. 6, The peroneus tertius or anticus; 7, its tendon. 8, The peroneus longus; 9, its upper extremity: it arises from the external tuberosity of the tibia, from the head and upper part of the external surface of the fibula, and from the intermuscular septa that separate it from the common extensor in front and from the soleus and flexor longus pollicis behind: the fleshy fibres are inserted into a tendon, which at first is situated in the thickness of the muscle, but appears external to it about the middle of the leg, 10: the tendon passes round the outer ankle in a groove common to it and the peroneus brevis, and crosses the external surface of the calcaneum, 10, to gain the oblique groove of the os cuboides. 11—11, The peroneus brevis; 12, its tendon; 13—13, fascia that separates the two peronei from the extensor digitorum and peroneus anticus. 14—15, The outer head of the gastrocnemius; 16, the soleus; 17—17, the tendo Achillis; 18, the flexor brevis digitorum; 19—20, muscles of the plantar region; 21, tendon of the biceps; 22, the ligamentum patellæ; 23, tendon of the extensors of the thigh; 24—25, external lateral ligament: 26, external interarticular cartilage; 27, prolongation of the fascia lata, which is inserted into the tubercle of the tibia; 28, tendon of the vastus externus; 29, annular ligament.

SECOND LAYER.

Fig. 2. *A*, the tibia; *B*, condyle of the tibia; *C*, tubercle of the tibia; *D*, external tuberosity; *E*, the fibula; *F*, head of the fibula; *G*, malleolus externus; *H*, the calcaneum.

1, the peroneus longus, cut across at the origin of the peroneus brevis which it covers; 2 and 3, its origin from the external tuberosity of the tibia and head of the fibula; 4, its tendon, about to enter the groove of the cuboid bone; 5—6, the peroneus brevis: it arises from the two lower thirds of the external surface of the fibula, and from the bands of fascia that separate it, anteriorly, 7—8, from the peroneus anticus, and posteriorly from the flexor longus pollicis: the fibres are inserted into the internal surface and borders of a flat tendon, 9, which is placed at the outer side of the muscle: the tendon, into which the fibres continued to be inserted until it turns round the outer ankle, glides over the os calcis below the tendon of the peroneus longus, and is inserted, 10, into the posterior extremity of the fifth metatarsal bone: it often sends a prolongation to the tendon of the extensor of the little toe; 11, the peroneus tertius; 12, its tendon; 13—14, the extensor digitorum longus; 15, the superior extremity of the tibialis anticus; 16, tendon of the biceps; 17, tendo Achillis; 18, annular ligament; 19, extensor brevis digitorum or musculus dorsi pedis.



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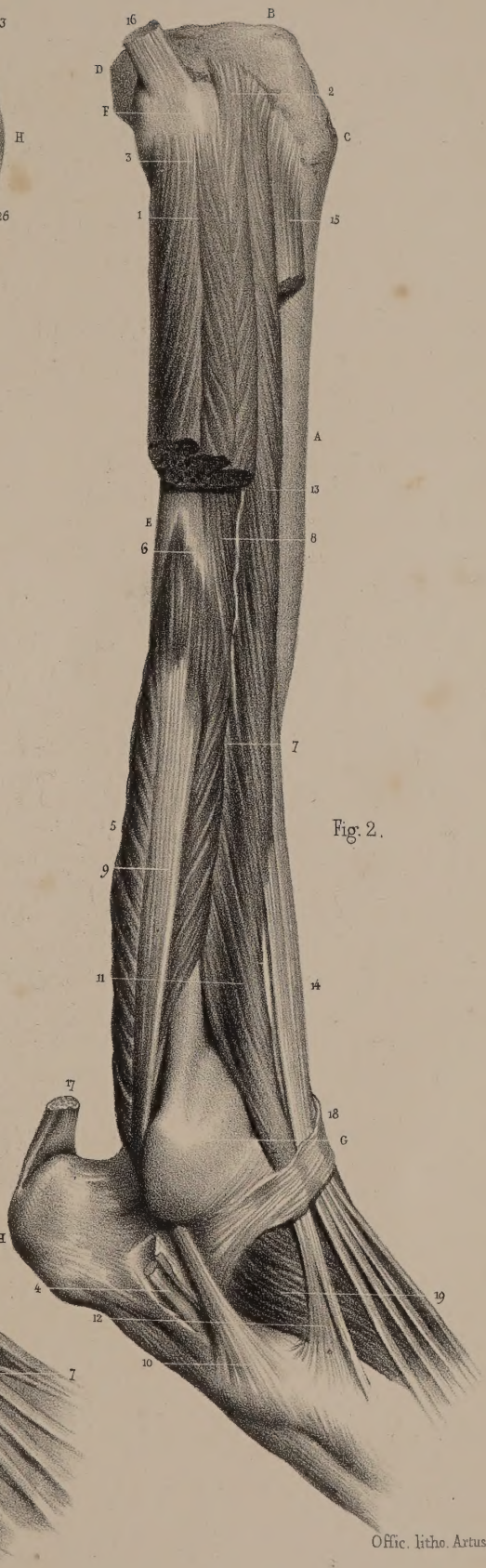

Fig. 2.

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Pl. 81.

Fig. 1.

Fig. 2.

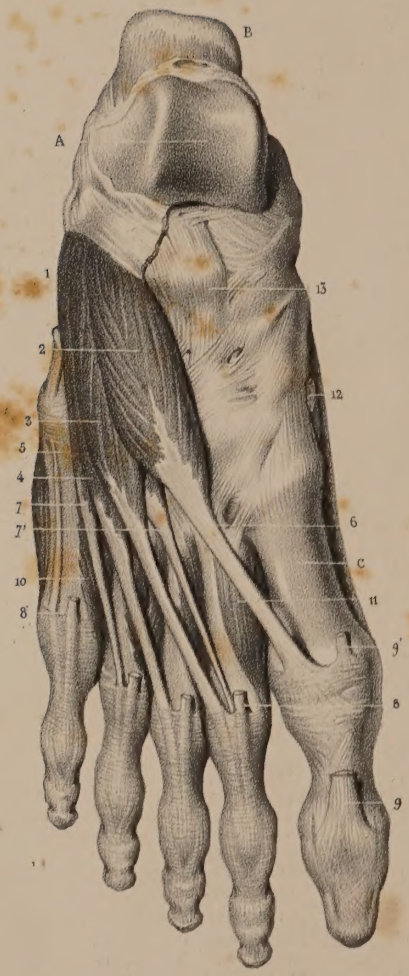

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PLATE LXXXI.

APPARATUS OF LOCOMOTION.—THE MUSCULAR SYSTEM.

INTERNAL REGION OF THE LEG.

Fig. 1, *A*, lower extremity of the femur; *B*, patella; *C*, anterior tuberosity of the tibia; *D*, inner aspect of the tibia; *E*, malleolus internus.

1—1—2, inner belly of the gastrocnemius; 3, soleus, the tendinous expansion of which unites with that of the gastrocnemius to form, 5, the tendo Achillis; 6, tendon of the plantaris longus; 7, tendon of the semimembranosus; 8, internal lateral ligament of the knee-joint; 9, popliteus; 10, flexor communis longus digitorum pedis; 11, flexor longus pollicis; 12, tendon of the tibialis positicus which runs to be inserted into, 13, the os scaphoides, and os cuneiforme internum; 14, internal annular ligament; 15, tibialis anticus, the tendon of which, 16, is inserted into, 17, the internal cuneiform bone; 18, anterior ligament of the ankle joint; 19, adductor pollicis; 20, internal fasciculus of the accessorius muscle; 21, plantar aponeurosis.

DORSAL REGION OF THE FOOT.

Fig. 2, *A*, astragalus; *B*, os calcis; *C*, first metacarpal bone.

1, extensor brevis digitorum pedis or pediæus, arising from the anterior portion of the outer aspect of the os calcis and anterior annular ligament, the belly of this muscle soon divides into four fleshy slips, 2, 3, 4, 5, which end in as many tendons, 7—7. The first of these tendons is the thickest and is inserted into the posterior extremity of the first phalanx of the great toe; the three others unite with the tendons of the long common extensor and terminate with them. The extensor brevis frequently gives off a small supernumerary tendon, 7′, to the second toe; 8, 8′, tendons of the extensor longus communis digitorum pedis; 9, tendon of the extensor proprius pollicis; 9′, fibrous expansion supplied by the tendon of the tibialis anticus; 10—11, interossei muscles; 12, tendon of the tibialis anticus; 13, superior astragalo-scaphoidal ligament.

PLATE LXXXII.

APPARATUS OF LOCOMOTION—THE MUSCULAR SYSTEM.

PLANTAR REGION.

FIRST LAYER.

Fig. 1, 1—2—3, adductor pollicis. This muscle arising fleshy from the internal and posterior part of the calcaneum, from the internal annular ligament, from the superior aspect of the plantar fascia, and from the fibrous septum which separates it from the flexor communis brevis digitorum, ends in a tendon, 4, 4, which is at first concealed in its substance, but which emerges at the level of the first cuneiform bone, unites by its inner edge to the short flexor, and runs to be attached to the internal sesamoid bone and inside of the base of the first phalanx of the great toe; 5—6—6', short flexor of the great toe; 7—7, tendon of the long flexor of the great toe; 8 plantar fascia. 9, short common flexor of the toes. This muscle arises from the posterior and inferior part of the os calcis, from the plantar fascia, from two fibrous septa which separate it from the adductor pollicis, and from the adductor minimi digiti. Having gained the middle of the sole of the foot, it divides, 10, 10, into four fasciculi, the tendons of which, 11—11, long and slender, lying under the tendons of the long common flexor, 12—12, enter along with them into the canals, half bony, half fibrous, of the phalanges. 13—13, lumbricales. 14—14', abductor minimi digiti. This muscle arises from the posterior and outer part of the os calcis, from a septum which divides it from the short common flexor, from the plantar fascia 15—15, which covers its inferior aspect and from 16—16, the posterior extremity of the fifth metacarpal bone. From these attachments the fleshy fibres proceed to terminate successively around a tendon, 17—17, which is inserted to the outside of the posterior extremity of the first phalanx of the little toe, 18, flexor brevis minimi digiti. 19, interossei.

SECOND LAYER.

Fig. 2, 1, tendon of the tibialis posticus; 2, 2', 3, tendon of the flexor longus pollicis; in the sole of the foot this tendon crosses the direction of the long common flexor, over which it lies, and to which it adheres by a very strong tendinous slip; it then proceeds between the abductor obliquus and flexor brevis pollicis, next between the two sesamoid bones of the metatarso phalangeal articulation and is inserted to the proximal extremity or base of the second phalanx of the great toe. 4, tendon of the long common flexor of the toes, which having received its accessory muscle and divided, 5, into four tendons. 6, 6, and traversed the clefts in the tendons, 7, 7, of the short common flexor, proceeds to be inserted 8, 8, into the posterior extremities or bases of the third or ungueal phalanges of the toes. The tendons of the short common flexor 7, 7, have the same disposition as those of the flexor sublimis communis of the hand; they are inserted into the margins of the second phalanges. 9, 9', accessorius, or accessory muscle of the long common flexor, consisting of two fasciculi, the inner and larger of which arises, 10, from the posterior and internal aspect of the os calcis, the external and smaller, 10', from the posterior and external aspect of the same bone: these two fasciculi end in fibrous expansions which unite with the tendons of the long common flexor; 11, calcaneo-cuboid ligament; 12—12, lumbricales, which correspond exactly with those of the hand; 13, 14, adductor pollicis divided near its origin. 15, 15', flexor brevis pollicis, short flexor of the great toe, connected by a fibrous expansion, 16, with the internal fasciculus of the accessorius muscle. 17, internal fasciculus of the abductor obliquus pollicis; 18, tendon of the peroneus longus reflected over the pulley of the os cuboides, 19—19, to gain its insertion, the posterior extremity of the first metatarsal bone. 20, flexor brevis minimi digiti, arising from, 21, the posterior extremity of the fifth metacarpal bone and the sheath which encloses the peroneus longus; and inserted by a tendon, 22, into the outer part of the base of the first phalanx of the little toe. 22, tendon of the abductor minimi digiti; 23, 24, interossei.

THIRD LAYER.

Fig. 3, 1, tendon of the adductor pollicis; 2, flexor brevis pollicis, which arises by tendinous fibres from, 3, the os cuboides and external cuneiform bone, from the ligamentum calcaneo-cuboideum, from the tendon of the tibialis posticus and occasionally from that of the flexor longus or of its accessory muscle by a small distinct slip, 5. From these different attachments, the fleshy fibres proceed to end in the tendon of the adductor pollicis, which is inserted, 6, into the internal sesamoid bone, and to the inside of the posterior extremity of the first phalanx. 7—7, tendon of the flexor longus pollicis; 8, fibrous sheath which encloses it. 9—9'—10, abductor obliquus pollicis. This muscle consists of two fasciculi: the internal fasciculus, 9, which is looked upon by many anatomists as forming part of the flexor brevis, arises along with this muscle from the os cuboides and ligamentum calcaneo-cuboideum; the outer fasciculus, 9'—10, arises from the os cuboides at the posterior extremities of the third and fourth metatarsal bones, and from the sheath of the tendon of the peroneus longus. The two fasciculi united proceed to be inserted, tendinous at 11, into the external sesamoid bone, and the outer side of the base of the first phalanx of the great toe. [The muscle just described, the abductor obliquus pollicis, is generally described by English anatomists, as a portion of the flexor brevis pollicis, which is a bicipital or two headed muscle]. 12—12—12, transversus pedis, or abductor transversus pollicis. This muscle composed of fasciculi which take their origin from the tendinous sheaths of the flexor communis, and transverse or metatarsal ligament, unites with the abductor obliquus [the inner portion of the flexor brevis pollicis] and is inserted along with it into, 13, the outer sesamoid bone. 14, tendon of the abductor minimi digiti, 15—16, flexor brevis minimi digiti. 18—19, interossei muscles. These muscles are seven in number: four dorsal and three plantar. The axis of the foot being represented by a line passing through the middle toe, the dorsal interossei will be found to be all abductors, and the plantar interossei all adductors. 20, tendon of the peroneus longus. 21, tendon of the tibialis posticus inserted into the os scaphoides and first or internal cuneiform bone. This tendon sends a strong slip, 22, to the third and fourth metatarsal bones. 23, sheath of the flexor communis longus digitorum; 24, sheath of the flexor longus pollicis; 25, ligamentum calcaneo-cuboideum; 26, ligamentum calcaneo-scaphoideum inferius; 27—27, tendons of the flexor communis longus digitorum pedis.

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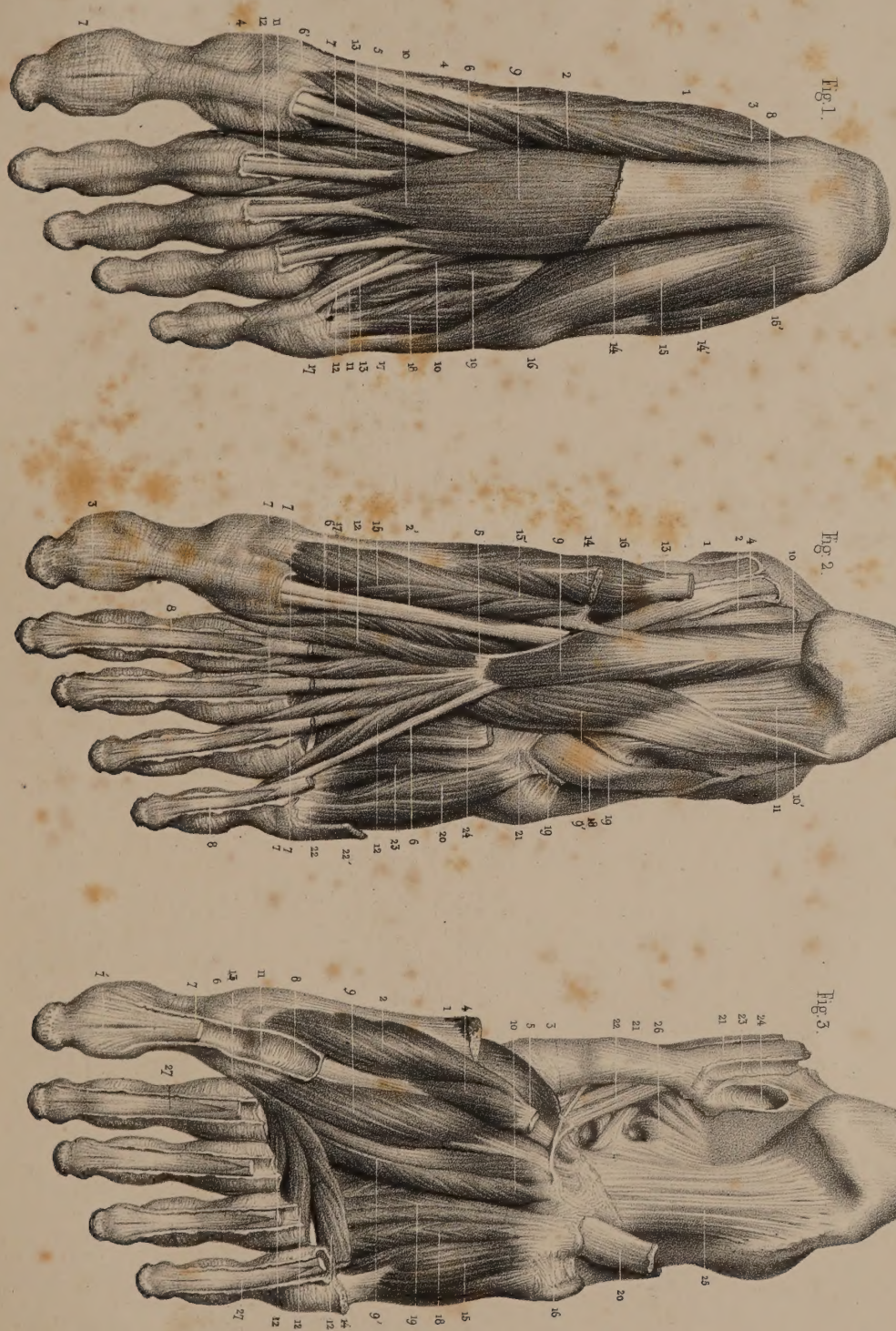

Fig. 1.

Fig. 2.

Fig. 3.

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